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ESSAYS, MONOGRAPHS, AND CASES.

On the Development of the Thorax by Special Exercises, as a Prophylactic and Remedial Measure in Phthisis and other Chronic Affections of the Lungs. By HENRY G. DAVIS, M.D., New York, member of the Mass. Med. Society, &c.

In a series of papers upon "*Deformities and their Remedies*," published in the AMERICAN MEDICAL MONTHLY for March, May and June, 1856, I incidentally remarked upon the effect of *special* exercise in developing the thorax, and consequently the lungs, and the influence of this development upon the general health, especially in counteracting a tendency to phthisis.

Within a few months, Dr. Edw. Smith, Assistant Physician to the Brompton Hospital for Consumption, England, has published* his views upon the nature and treatment of phthisis, which accord so nearly with those I have for a long time entertained, that it is with peculiar pleasure I welcome his expression of an opinion corroborating my own views, sustained, as it is, by such extensive opportunities of observation and rigid investigation.

Believing, however, that I have attained one point in the treatment which seems to have been foreshadowed in Dr. Smith's mind, but which he has failed to develop; I shall attempt in this paper to ex-

* *Lancet*, Nov. 1, 1855; *British Med. Journal*, Jan. 10 and Feb. 7, 1857.

plain the particular means referred to, which are based upon the same philosophical deductions as are advanced by Dr. Smith. To do this, I premise, by stating, as briefly as possible, some of the main features in Dr. Smith's paper.

The nature of phthisis he believes to consist in a lessened inspiratory action of the air-cells of the lungs. That phthisis is incurred by a multitude of causes he admits, but yet affirms that they all have a tendency to exhaustion; and that though many, they have one common mode of action in inducing the disease.

The lessened action of the air-cells he proves from the lessened vital capacity, feeble respiratory power, and lessened mobility in the early stage of the disease, the consequently lessened vesicular murmur, increased harshness of respiration and flattening of the chest, with or without slight dullness, indicative of atrophy of the lungs. He also proves that these signs are found in those cases admitted to be prone to phthisis.

As my object in this paper is to show the effect of *special* exercise upon the chest, and through that upon the lungs, it will not be necessary to notice other points, which he so ably discusses, in reference to the disease.

Under the head of treatment, Dr. S. recommends "mechanical distention of the air-cells, to a degree beyond that which takes place perhaps in health, but certainly in the state of enfeebled respiration in which we find the patient."

He objects, somewhat, to bodily exertion, to attain this object, because it also increases the frequency of the pulse, which is already too fast for that healthy proportion between it and the respiration. He says, "the effect of much exercise in phthisis is, therefore, evil certainly, although at the same time it may be, but less certainly, good." "Now, is it possible to meet this difficulty, and to find a mode whereby the depth of the inspiratory act shall be increased, and yet the rapidity of the blood current not sensibly promoted?" Voluntary deep inspirations are suggested as a means, but are objected to for the reason that they cannot be continued, in consequence of the fatigue to the system. In speaking of deep inspirations as a remedial measure, he says, "I am not clear but that sometimes, and perhaps frequently, the effect now referred to lessens the frequency, and that without increasing the depth of inspiration; for *nothing is more common than for us to hold our breath* when making any unusual voluntary exertion." I have italicised the above, in order to draw attention to its import, as illustrating how near a mind may approach a principle, and yet leave

it undiscovered. For it is a fact, that in all uses of the arm, such as boxing, fencing, chopping, striking, swinging the dumb-bells, &c., (except when the arms are pendent,) indeed in all efforts that are violent, in which we make the body the point towards which the muscles attached to the humerus contract, we are obliged to fix the chest during their contraction. In lesser efforts this is in a measure avoided; but in all where anything like a vigorous exertion is made, in the manner referred to, the chest *must* be held while the muscles contract. This fixed state of the chest gives the end of the muscles an immovable point, *from which* they can act upon the parts *to which* the other ends are attached.

It should be remembered that most, if not all the muscles that are used in moving the arm, are muscles of respiration, and that they contract in the opposite direction when used for the latter purpose. In this act, (voluntary respiration,) as the object sought is to enlarge the cavity of the chest, all the muscles that would tend to prevent this enlargement will be relaxed, in conformity with that law of the system which requires one set of muscles to be at rest when their antagonists are in action. If this be correct, how can we enlarge the thorax by those exercises *in which* we are under the necessity, in a greater or less degree, of fixing the ribs and other parts concerned in the act of respiration? It is obvious, then, if we desire to enlarge the chest by voluntary exercise, we must adopt some mode in which the muscles will be called upon to contract in the same direction, as in the act of inflating the lungs by a voluntary effort; for, as I have before stated, in this mode of action all the parts of the chest, that move during respiration, are lax, so as in no way to interfere with its full expansion. In this is contained the principle so near being discovered by Dr. Smith. This principle lies at the foundation, and should be our guide in all exercises recommended for expanding the chest, and thereby dilating or developing the air-cells of the lungs.

Exercises *can* be prescribed for this purpose, that will not produce that sense of fatigue which Dr. Smith found to follow voluntary respiration; exercises that will not only accomplish the object at which *he* aims more effectually, but will at the same time invigorate other portions of the system; will tend to exhilarate and encourage, while the effect of voluntary deep inspirations is, I believe, to give rise to feelings of lassitude and discouragement, although they may be ultimately beneficial.

There are other objections to voluntary respirations mentioned, but I shall speak of but one other. "It is almost impossible," says Dr.

Smith, "to persuade phthisical patients to take an inspiration of the depth referred to."

Now, with the method of special exercises for the chest, which I would propose to be adopted in the treatment of phthisis, the indications demanded, by the showing of Dr. Smith, are met, and the objections raised against voluntary respirations are obviated. The principle I have already laid down; that they should imitate nature, should be brought about by developing the cavity of the thorax, through the action of the muscles, in the same direction as in voluntary respiration.

This may appear, when viewed cursorily, to be productive of the same amount of fatigue and lassitude as voluntary inspirations, yet the trial will convince any one that such is not the fact. The difference appears to be that, in voluntary inspirations, we combine with them the involuntary effort, and as each inspiration by the former process is continued much longer than when performed by the latter *exclusively*, it causes the same sense of fatigue that the same effort would if exerted to retain the breath. This, of course, is only intended to apply to a sense of muscular fatigue, and not to any effect that inspiration might have upon the circulation. This difference is illustrated in a person laboring with asthma; if he breathe by a voluntary effort, although compelled, as it were, against his will, by the necessity felt for increased respiration, he will feel fatigue in those muscles of voluntary respiration, and will experience much less relief than when he so places his arms as to allow his chest to hang pendent from his shoulders, the pectoral muscles sustaining in a great measure the thorax, the head reclining upon the hands or wrists. In this position he will breathe quite easily, and feel refreshed after sleeping; while in any other, although he might be able to sleep, he would feel the effect of imperfect respiration. This is not a relief to asthma, like that produced by medication; for, if he changes his position, the asthma remains the same. It is the expansion of the chest, to the extent effected, by the weight resting on or sustained by the pectoral muscles, that gives him relief, by its continual enlargement of the thoracic cavity.

It is upon this principle that I would enlarge the thorax, and thereby give the patient the benefit of full, deep inspirations, and cause him to repeat them for a much longer period than by a simple effort at deep voluntary inspirations. In the plan I propose, the pectoral muscles do not contract; they are drawn tense, which does not exhaust, like a contraction of them following volition. Another ad-

vantage of my method, and one that supersedes all others, is, that it accomplishes the object of effecting deep inspirations more perfectly than by voluntary effort or any other mode.

The entire weight of the body can be thrown upon the muscles connected with the scapula and the head of the humerus; and, if thought advisable, the patient can, even while in this position, make *voluntary* inspirations, thus combining the two.

In this way the chest can be expanded to its fullest capacity, producing a large vacuum, into which the air rushes under a pressure of fifteen pounds to the square inch. Besides the deep inspiration effected by this process, it is as beneficial to the system generally as any other exercise that has this for its exclusive object. From its producing a general glow over the whole system, it can be taken in a cold room or out of doors, the patient retiring to a comfortable temperature when he ceases to exercise. This mode, in addition to its other considerations, gives rise to a degree of exhilaration which "does good like a medicine," and encourages the patient to persevere. It also increases the appetite and the power of assimilation to a wonderful degree; some of its effects in this respect will be mentioned, in the accompanying report of cases treated upon this principle.

Dr. Smith expresses fears about adopting any exercise, on account of its increasing the current of the blood. The increased frequency of the pulse, in what he terms the pre-tubercular stage, appears to be owing to diminished capacity of the lungs, either functional or organic; and the system feeling the effect, in the want of a more perfect aëration of the blood, increases the frequency of the pulse, that the blood may be more rapidly sent to the lungs to be changed; for the same reason the respiration is more frequent than natural, although the proportions that obtain in health are somewhat changed in disease.

If this view is correct, and the effect of treatment would seem to confirm it, then any process by which the volume of the lungs is increased would diminish the frequency of the pulse; therefore there need be no fears on account of an increase of the blood current, by a *proper* system of exercise.

In all the exercises which I recommend for the purpose of developing the chest and increasing the volume of lung, I make the hands the fixed point, moving the body towards them, or suspending a part or the whole of its weight by them. In this way more or less of the weight of the body is thrown upon the pectoral muscles, and as they arise from the sternum and ribs they act upon them in the same direction that they do in voluntary inspirations, without the fatigue

that follows that effort. In this use of these muscles there is no necessity of fixing the parts from which they take their rise, as we do when we use them in direct action upon the arm; consequently the ribs and sternum are left free to be drawn by them, as illustrated by their use in asthma. Another consideration is, that involuntary respiration goes on without being disturbed, even should the patient suspend himself by the hands for fifteen or twenty minutes, and this too, it will be recollected, when the chest is expanded by so much of the weight as rests upon the pectoral muscles.

It is immaterial what this exercise is, provided the hands are made the fixed point. I have used a bar, confined to the ceiling at each end by ropes; from this bar the patient suspends himself by the hands, or, if sufficiently strong, he draws himself up until his chin reaches the bar, then bringing his arms into an extended position, he may repeat it as many times as his strength will permit; or he may throw his weight first upon one hand and then upon the other, alternately; but this requires much practice and muscular power. Another mode is to use ropes with knots every six or eight inches; these he uses to hold upon as he climbs up, or he may suspend his weight, holding by his hands, and swing back and forth; metallic rings may be substituted in the place of knots, answering the same purpose. If quite feeble, he can lean upon some object with his hands at arms-length, the object being of such a height that the body will be inclined at an angle of thirty-five or forty degrees; in this position the pectoral muscles will support a portion of the weight, and thus enlarge the chest. To secure the full advantage to be derived from this mode of exercise, it should be prosecuted faithfully. My advice has been, to repeat it every half hour, and continue it until a considerable degree of fatigue was produced.

In a paper referred to at the commencement of this article, the case of a young lady was given as illustrating the effect of this exercise; it was her case that first led me to observe the influence of increased respiration upon digestion and assimilation.

Eighteen years since, a physician having a sister-in-law in very feeble health, in consumption, as he supposed, while conversing with me about her difficulties, remarked, that she had a lateral curvature of the spine. I suggested that this might affect her lungs unfavorably, and advised her being put under treatment for it, to which he readily assented. She was directed a system of exercise, in which she held either by one or both hands; her exercises being selected for the purpose of remedying the curvature, were not always the best for devel-

oping the chest. At first she could support but a part of her weight; her muscular strength, however, rapidly increased, so that in a few days she could sustain her entire weight; her undivided time was devoted to the exercises; her appetite improved from the first day, until nothing eatable was refused because it did not please the palate. In fourteen days she had increased in weight ten pounds; in four months, twenty-eight pounds, when she dropped the treatment, having gradually diminished it after the first few weeks. Her chest, from her admeasurements, was four inches larger in circumference than when she commenced treatment, and, to the practised eye, appeared abnormal; her face being small and her neck long, indicated a narrow chest naturally, yet the treatment had rendered it very broad.

With so great an increase of flesh and of the volume of lungs, it would have been an anomally if the symptoms of disease had not left her. She is living at the present time, exhibiting the same large chest and healthy lungs.

In 1852, the parents of Miss S. consulted me in reference to the health of their daughter, remarking, "that she appeared to be going in the same way that her sisters did," they having died with consumption. Her age was 24, of brunette complexion, possessed of that mild, amiable disposition so often observed in females predisposed to phthisis. The mother said she had gradually lost flesh and strength for several months; at this time she was incapable of taking much exercise, being easily fatigued. Her countenance was rather pale, and expressive of lassitude; pulse more frequent than natural, and feeble; the inspirations light, and somewhat accelerated, attended with a disposition to cough.

Upon an examination of the chest, there was found dullness upon percussion in the clavicular region, but more particularly upon the right side, the vesicular murmur being less in the upper lobe of both lungs, but least in that of the right side. The amount of air respired was evidently much less than in health. As I have not the minutes of these cases by me, they are given from memory, yet they can be relied upon for their general features. That there was tubercular deposit, could not be affirmed with certainty, yet, from her constitutional tendencies, it would be fair to conclude there was. Her appetite was precarious; menstruation regular, yet somewhat scanty.

As the patient was to remain under my immediate supervision, I decided to put her upon a system of exercise, without any medication or change of diet, for the purpose of testing the effect of expanding the chest, upon the principles mentioned. The case was watched with

much interest, and it was not many days before a decided improvement could be perceived. In this case I directed a round bar, suspended at each end by ropes attached to the ceiling, the bar being placed as high as she could reach when standing upon her toes. At first, she could sustain only a small portion of her weight when holding by both hands; she rapidly gained muscular power in her arms and hands, so as to be able to swing to and fro. This exercise was taken in a room open to the external air, and at a temperature that would be uncomfortably cool for a person in health, unless actively employed. She was to repeat the exercise every half hour, and continue it until weariness was produced. At first, it occupied but a minute or two, but was gradually extended until it employed half the time. From the commencement of the treatment, she began to improve, and so continued without interruption until she was free from all symptoms of disease. The physical signs indicated a perfect restoration of the upper lobes of both lungs. The increase of flesh was nearly equal to that in the first-mentioned case. It will be recollected that the patient during this time had taken no medicine, had partaken of the ordinary diet of the family, and conformed to its regulations. As before stated, I was desirous of testing the effect of this treatment so far as it could be, by a single case. For this reason, and one other which I will mention, the only change directed was the exercise.

I was particular in giving direction to this effect, not only that I might fully test in her case the influence of the exercise, but that I might put as far as possible from her mind all idea of her being an invalid. This mental impression is deserving, in my estimation, vastly more consideration than is generally given it by the profession.

Aside from the other effects of mental depression, its influence is to diminish the frequency as well as the depth of the inspirations.

Sighing is the evidence of a prolonged interval between the inspirations; the necessity felt for breathing causes a deeper inspiration than natural; this deep inspiration is termed sighing.

It is for this reason, I apprehend, that grief and severe disappointment are frequently observed to result in phthisis, rather than in some other disease. It is this mechanical influence, (if I may be allowed the expression,) to which I would direct attention, as having been too much overlooked.

In 1853, the wife of G. H. R. requested me to visit her husband, who had hitherto refused to put himself under treatment, alleging as a reason that the other members of his family had not been benefited by medicine, but had failed rapidly under its use. He was the last

but one of a family of eight, the father and six of his children having died with phthisis in rapid succession. Mr. R. stated that he had been subject for several years to small hæmorrhages from his lungs, attended with more or less constant disposition to cough. He had not allowed these to interfere with his business, going out in all states of the weather, and practising showering with cold water every morning.

His flesh and strength had been gradually diminishing, but he had never been confined to the house until the Tuesday preceding my first visit. At this visit, I found him unable to sit up all day, being obliged to lie down after each paroxysm of coughing, they being attended with copious perspiration and prostration; hectic fever and night sweats occurred every day; his appetite had left him since his confinement to the house. His chest was very flat, head thrown forward, giving him the appearance of stooping, the respiration feeble and frequent, the pulse corresponded with the symptoms. He felt that the disease had now gained the ascendency, and that he had but the last stages to pass through before following the other members of the family.

His appearance and antecedents were so discouraging that I omitted making a particular examination of his chest, fearing its influence upon his mind; but I gave him all the encouragement I could, by stating my confidence in special exercises for counteracting his disease.

In this case I directed medicines for the purpose of mitigating the cough, and checking the secretions of the lungs and the night sweats.

I prescribed Tr. Sang., Tr. Digitalis, Tr. Strychnos Nux Vom, and Morphine, combined, and directed that the whole surface of his body should be thoroughly rubbed, before retiring for the night, with dry flannel.

In a few days he was able to walk into a cold room and suspend a portion of his weight upon his arms, as in the last-mentioned case. Being a man of more than ordinary energy, and having withal the feeling that a man may drive off disease, he forced himself to the effort, and each day rewarded him by an increase of appetite and strength. The expectoration diminished, and with it, the cough. In three weeks he objected to taking any more medicine, as he felt so well, but continued the exercise faithfully, until he was able to be in his business the whole day, when he practised it as he happened to be at his house. Like most men, he could not be persuaded to neglect his business after feeling able to attend to it. He was not free from disease, and will, without doubt, die with phthisis; yet he has enjoy-

ed, up to the present time, very good health. Could he have been persuaded to follow the treatment for a month longer with the same faithfulness, the result would have been undoubtedly much more favorable. He remarked to me, after he was able to be out, that "my treatment would ruin a man—it would take all that he could earn to supply him with food." He could, at this time, take a full, deep inspiration, without any disposition to cough. His chest was evidently enlarged, as was manifest from the increased quantity of air he could inhale, as well as from the change in his figure to an upright position. His step was now elastic and quick, and his movements exhibited the energy of vigorous health.

I have given three cases illustrating the effect of exercise. The first might be termed the incipient or premonitory; the second, that of tubercular deposit; while in the last case, softening had taken place. It might be remarked, that when phthisis manifests its symptoms in a female at the age of 16 or 17, it is very likely to be rapid in its course, and to pass quickly into the softening stage. It is an admitted fact, I believe, that when it is developed at this time of life, it is more uncontrollable as well as more rapid, than at any other period.

It will be understood that the writer does not consider these cases as conclusive; he is fully aware that they are deficient in detail, yet they possess an interest as illustrating the effect of the special exercises, to which he would direct the attention of the profession. They exhibit the influence of such exercises upon the respiration and assimilation; they also indicate the permanency of these effects.

The first and second cases are, at the present time, free from disease of the lungs, and enjoying good health; the other, as has been stated, followed the treatment no farther than was necessary to enable him to attend to his business. When the disease is so far advanced as in his case, and at his age, the treatment should be continued for months; the thorax is much firmer, and the bony structure being fully developed, a permanent alteration can only be effected through the slow process of renewal that goes on after maturity.

The profession appear to be gradually approaching the conclusion, that the prophylactic treatment of phthisis must be sought elsewhere than among the drugs; that there is some defect in the system, either hereditary or acquired, that must be overcome in order to avoid a fatal result. I think it may also be said that the opinion is becoming general, that the cause is to be found in whatever interferes with that change which the lungs are designed to effect upon venous blood,

whether it be in the air respired, in the lungs themselves, or from their inability to fulfil their functions, in consequence of the restricted compartments in which they perform their labor.

Dr. McCormac, of Belfast, Ireland, in his work on consumption, says, "tuberculous scrofulous deposits, then, whether in the offspring of scrofulous, consumptive parents, or the offspring of persons free from scrofulous, tuberculous disease, are alike, and in every case, owing to the insufficient, imperfect performance of the respiratory function. The carbon is retained—in other words it is not discharged or sufficiently discharged from the blood in the lungs, and finding no adequate outlet by the liver, skin, or other possible emunctories, being neither burnt off in the lungs nor expended in the tissues, is deposited mainly as a hydro-carbon in the lungs and other organs, under the form of the bodies known by the designation of tubercles." He attributes this imperfect decarbonization of the blood to the impurity of the air we breathe in our places of business and pleasure, but more particularly in our ill-ventilated sleeping apartments.

That we breathe much impure air, is undoubtedly true, and the subject deserves all the consideration he has given it; yet I cannot think that all would escape phthisis, even should they never breathe impure air, upon the supposition that his views of the cause are correct. The habits and employments of a large proportion of the community are such, that they require but a small amount of air to supply the wants of the system; the student, the accountant, the female confined to her needle, or those over-taxed by idleness, require but a limited supply of air; their respiration is slight, the chest is seldom or never expanded to its full extent; it is kept day after day, and month after month in this state of semi-development, and the consequence is, that the chest follows that law of the animal economy which requires the partial or entire removal of a part when it remains habitually unemployed, or if the parts remain permanently changed in their relative position to each other, as in bones to which ligaments and muscles are attached; the ligaments and muscles become permanently shortened, conforming in the new deposit to the shortened distance between their attachments. The same law operates upon the thorax. If it is kept by a limited use at a diminished capacity, all the parts will, in a longer or shorter time, conform to this habit, and the lungs will correspond to the contracted state of the thorax, and the individual will now feel fatigue when making any increased exertion. When he has arrived at this state, one in which he has just sufficient volume of lungs to sustain life, while no demand is made

upon them beyond that requiring a feeble respiration, he may call himself well; but should he take cold, or any disease of the lungs arise, or should he be placed under unfavorable circumstances as to purity of air respired, (granting that he has heretofore breathed only pure air,) he would immediately suffer; the system would be below the point of sustaining itself, and must fail in proportion as the lungs failed to perform their function.

The full development of the chest, by the means I have proposed, provides against such contingencies. If the thorax is of that capacity that it may contain a volume of lungs sufficient to perform double the amount of service ordinarily required of them, then, when placed in an impure atmosphere, a quantity of air *can* be inhaled that will enable the lungs to fully discharge their duty; while in the other case, with a volume of lungs barely sufficient to meet the demands of the system, when supplied with a pure air, the system must necessarily yield to the deleterious influence of imperfectly aërated blood. Large lungs can be partially inflated, and thus perform a small amount of labor; but a contracted chest and limited lungs cannot supply the place of the former when called upon for increased service by the wants of the system. A large vessel can be used to convey a small quantity, but the reverse is not so practicable, unless by the frequency; this we see attempted by the lungs; as their capacity diminishes, the frequency of the respiration is increased.

The plan I have introduced for developing the thorax does not interfere with any medication that might be considered desirable, but is superadded to all the remedial measures hitherto recommended.

It may be objected by some, that this process is purely mechanical, and, therefore, beneath the consideration of the profession. It might be a sufficient response to this feeling, to say, that it cannot be beneath the dignity of man to investigate any process, however humble in our estimation, that the Creator in his wisdom has seen fit to institute. The entire process of introducing air into the lungs is mechanical, as much so as the production of a vacuum in the air pump, although the power operating in the former case exists in the machine itself.

In investigating this measure, the inquirer should first examine it as a mechanical operation. Let him consider the lungs and thorax as part of a machine for furnishing air to operate upon the blood, as he would investigate the capacity and power of any apparatus for furnishing air to a smelting furnace.

This view of respiration deserves a more careful study than it has

heretofore received from the profession. Without a large chest and a corresponding volume of lungs, all our medication in phthisis will be but palliative; but when we, by proper training, develop in our youth the full capacity of the respiratory apparatus, then medication (if called for) will be productive of the most happy results.

67 Union Place.

Selections from Favorite Prescriptions of Living American Practitioners. By Horace Green, M.D., &c.

(CONTINUED.)

Antispasmodics.

We define *antispasmodics* to be medicines which exert a direct control over spasmodic action; or those substances which counteract irregular or inordinate muscular action.

It is doubted by some therapeutists whether we possess any medicinal substances which do act directly on the muscular fibre. Those agents which are ordinarily arranged in the class antispasmodics are, by many, believed to act as indirect agents, relieving spasmodic action by revulsion, or through the influence which they exert upon other parts of the nervous system than those concerned in the muscular contraction. There is, however, a class of medicinal agents which exerts, unquestionably, a direct control over spasmodic muscular action. We have, therefore, both direct and indirect antispasmodics. As an efficacious remedy, in the treatment of hysterical affections, and in subduing great nervous irritation, we may administer the following antispasmodic:

℞.—Assafœtidæ, ʒiss.
Morph. sulph. gr. v.
Saponis dur. ℈ij.

Misce.—Fiat massa in pil. xl. divide, quarum capiat unam pro re nâta, vel binas, horâ somni.

Should a more stimulant antispasmodic be required, the following may be substituted:

℞.—Assafœtidæ, ʒi.
Morph. sulph. gr. iij.
Camphori pulv. ℈ij.

Misce.—Fiat massa et in pil. xxx. divided. Sumat unam ter quaterve in die.

Musk, when it can be obtained pure, is a powerful nervous stimulant. It is sometimes given in nervous and hysterical affections, in combination with other antispasmodics.

℞.—Moschi, ʒi.
Assafœtidæ, ʒiss.
Camphori pulv. ʒss.
Extracti Gentianæ, q. s. ut fiat pil. xxx. quarum capiat unam ter in die.

The administration of musk has been much commended in hiccough, and in the subsultus of typhous and other low and malignant fevers.

℞.—Moschi, ʒi.
Æther sulph.
Tinct. opii, aa. ʒiss.
Aquæ cinnam. ʒiiss.
Syrupi simp. ʒiss.
Misce.—Fiat mistura de quâ capiat cochl. j mag. ter in die.

By a combination of two or more of the antispasmodics, we obtain a more powerful effect in the treatment of hysterical and other nervous affections, than results, ordinarily, from the single administration of any one of these remedies.

℞.—Tincturæ Castori,
Tinct. Assafœtidæ, aa. ʒiss.
Aquæ Camphoræ, ʒi.
Spirit ammon. aromat. ʒss.
Syrupi acaciæ, ʒiss.
Misce.—Fiat mistura, quarum capiat cochl. j. mag. pro re nâta.

The above mixture, given in doses of a table-spoonful every hour or two, has been recommended as a powerful antispasmodic in hysteria.

We have found the following mixture a very useful medicine in various nervous and spasmodic diseases:

℞.—Tinct. Castori, ʒiss.
Morph. sulph. gr. iv.
Tinct. valerianæ, ʒiss.
Syrupi acaciæ, ʒi.
Misce.—Fiat mistura; sumat. cochl. j. mod. secundâ quâque horâ.

In spasm of the stomach, arising from flatulence; and for relieving cardialgia, the subjoined mixture will be found very efficacious:

℞.—Tinct. valerianæ, ʒi.
Magnesiæ carb. ʒij.
Tinct. opii, f. ʒi.
Aquæ menth. pip. ʒiij.
Olei anisi, m. xl.
Misce.—Fiat mistura, cujus capiat cochl. parv. omni horâ, vel sæpius.

Vel: ℞.—Tinct. lavendul. comp. ʒiss.
Spirit carui, ʒij.
Tinct. opii, f. ʒi.
Æther sulph. ʒss.
Aquæ font. ʒiv.
Misce.—Fiat mistura; capiat cochl. j. mag. pro re natâ.

The valerianate of zinc has been much employed by some practitioners, by whom it is recommended as a valuable tonic and antispasmodic, in the treatment of hysteria and other nervous affections.

℞.—Zinci valerianatis, gr. xii.
Tincturæ valerianæ, ʒss.
Aquæ cinnam. ʒij.
Syrupi simp. ʒss.
Aquæ font. ʒiij.

Misce.—Fiat mistura, cujus capiat semiunciam sextis horis.

As an antispasmodic in the treatment of chorea, the valerianate of zinc has been much commended by some experienced physicians. In combination with the subnitrate of bismuth, and the extract of hyoscyamus, we can recommend the valerianate of zinc as a most useful remedy not only in chorea, but in neuralgia and other nervous diseases.

℞.—Extract. hyoscyami, ℈ij.
Zinci valerianatis, ℈ij.
Bismuth subnit. ʒi.

Misce.—Fiat massa, et in pil. xl. div., quarum capiat unam, ter quaterve in die.

The valerianate of ammonia has been recommended, recently, by practitioners, both at home and abroad, as an antispasmodic in hysteria, but more especially in the treatment of facial neuralgia. It has been employed by Dr. Declat, and some other foreign practitioners, with great success, in the treatment of nervous diseases.

Administered in doses of a teaspoonful, morning and evening, it has succeeded in controling neuralgic pains after all the ordinary means have been tried, in succession, without avail. If pure, it should be administered in diminished doses from those recommended by Dr. Declat.

We have employed the following mixture in severe facial neuralgia:

℞.—Ammon. valerianatis, f. ʒi.
Syrupi tolutan, ʒi.

Misce.—Sumat cochl. parv. quartis horis.

Anthelmintics.

That class of medicinal agents which possesses the property of destroying worms, or of expelling them from the intestinal canal, is called anthelmintics. The principle on which anthelmintics operate is not the same with all. Some by their disagreeable odor destroy or dislodge the worms; others by mechanical irritation; and others, again, by some unknown, specific operation.

In selecting these remedies, regard should be had to the character of the agent employed, and to the mode of application, with reference to the species of intestinal worms to be destroyed or removed. A great variety of animal parasites have been found, from time to time, in the human body.* Of those whose *habitat* is the alimentary canal, and for whose removal medicinal agents are frequently required, there are four species; the tænia or tape worm, the trichuris or tricocephalus, ascaris vermicularis, and ascaris lumbricoides.

The preparations of mercury have long been employed for expelling the lumbrici from the intestinal canal. Calomel, especially, administered in the ordinary purgative doses, has proved a most efficient anthelmintic for the removal of the round worm. In the United States, the spigelia marilandica is much employed, and is considered one of the most powerful and certain of the anthelmintics.

℞.—Spigeliæ mariland. ℥ss.
Aquæ ferventis, Oj.

Macera per horam, quarum sumat cochl. mag. tertiis vel quartis horis.

If a moderate dose of calomel be given in the evening, sufficient to produce a mild cathartic effect, and its operation followed the next day by the administration of the infusion of pinkroot, in doses of from half a fluid ounce to a fluid ounce, once in three or four hours, we have found this plan altogether more efficient than when the spigelia is given without the calomel. An active dose of castor oil should follow the last dose of pinkroot.

℞.—Spigeliæ pulv. ʒiss.
Stanni pulv. ʒj.
M. Syrupi simp. q. s.

Fiat electuarium, cujus sumat. ʒi. omni mane noctique.

After the second or third day this medicine should be followed by a full dose of castor oil. The above combination of spigelia and tin is considered by some practitioners as being a very powerful and efficacious anthelmintic. Küchenmeister, however, protests against the administration of tin-filings, not only because of the uncertainty of the remedy, but because of the irritation of the intestinal membrane, excited by this agent.

It is advised by some practitioners to unite a purgative with the pinkroot.

* A very valuable work on the "Animal and Vegetable Parasites of the Human Body," by Dr. Frederich Küchenmeister, of Germany, has been, very recently, translated and published by the Sydenham Society. It contains much that is new and interesting on this subject, and adds to our knowledge of human parasites.

℞.—Spigeliæ mariland. ℥ss.
Sennæ, ℥iij.
Anisi, ℥i.
Aquæ ferventis, Oj.

Macera per horam, sumat cochl. ij. ampla tertiis horis.

Dr. A. L. Cox, a distinguished, and, for many years, a successful practitioner in this city, was accustomed to employ the following anthelmintic:

℞.—Spigeliæ mariland.
Sennæ, aa. ℥ss.
Potassæ bitart. ℥i.
Jalapæ pulv. ℥ss.
Sem. cardamon. ℥ss.
Extract glycyrrh. ℥ij.
Aquæ ferventis, Oss.

Macera per horam, sumat cochl. j. vel ij. ampla, pro re nâta.

The *Filix mas*, or *Male fern*, although a foreign remedy, has been much employed in the United States as a vermifuge, particularly for the expulsion of the tape worm. It may be administered in the form of powder, or in decoction.

℞.—Filicis maris pulv. ℥i.
Syrupi simp. q. s.

M.—Fiat electuarium, cujus sumat ℥i. vel ℥ij. omni mane nocteque.

The remedy should be given on an empty stomach, and after being continued two or three days should be followed by an active cathartic.

℞.—Filicis maris, ℥i.
Aquæ ferventis, Oj.

Macera per horam, sumat cochl. ij. ampla, mane ac nocte.

To an adult, a wineglass full of the above decoction may be given, fasting, twice or thrice daily; and followed by a cathartic as above.

The *Kousso*, another foreign remedy, has also been employed by American practitioners with considerable success, for the treatment of the tape worm.

Kousso is the flowers of a plant, the *Brayera Anthelmintica*. It is ordinarily given in powder, and should be administered on an empty stomach.

It will prove more certainly efficacious if preceded by a cathartic.

℞.—Flo. brayeræ anthelmint, ℥ss.
Aquæ tepidæ, Oss.

Misce.—Sumat ℥ij. omni hora quadrante.

The infusion should be taken in divided doses as above, on an empty stomach. After a few hours, a full dose of castor oil, or some other brisk cathartic, should be administered.

Prof. Raimann, of Vienna, has been quite successful of late in the employment of kousso, exhibited after the following manner: An infuso-decoction is made by macerating ʒvi. of kousso for twenty-four hours in cold water, and then boiled for half an hour. It is then taken whilst fasting, in two portions, without straining, and two hours afterwards from one to two ounces of castor oil. This remedy acts with great certainty.*

Many practitioners consider the oil of turpentine the best anthelmintic in tinea. Large doses are required for the treatment of the tape worm.

℞.—Olei terebinth. ʒi.
Decoc. hordii. ʒij.

M.—Fiat haustus.

After repeating this dose for two or three mornings, if it does not purge, it should be followed by a dose of castor oil.

Küchenmeister likewise regards oil of turpentine one of the best and most energetic remedies for tape worms. He advises that this medicine be administered at bed time, and in a dose of one ounce triturated with the same amount of castor oil and honey, and the yolks of three eggs. It should be given in divided doses, and all in the course of an hour or an hour and a half.

Under the name of *semen contra*, the East has furnished to Europe a species of worm-seed, which has enjoyed a great reputation as an anthelmintic. It has seldom been used in this country. It contains two principles, which are equally efficacious, a volatile oil and *santonin*. This latter principle has recently been introduced into this country, and is especially recommended for the treatment of worms in children, on account of its want of taste. It is given in the dose of from a half a grain to three grains, twice a day. An agreeable form for children is the sugar-coated pills of Garnier, Lamoureux & Co., which contain each one-half of a grain, and invite the little patient by their appearance to take what otherwise he would struggle against. The dose should be repeated for several days. It seldom requires a cathartic, as it acts efficaciously as a cathartic in the larger doses.

The species of worm-seed better known to practitioners in this country is the *chenopodium anthelminticum*. It is reputed for its expulsive powers over the round worm. The oil is a favorite anthelmintic in some of the dispensaries of this city. In this form the chenopodium is used with much success by one of my friends, Physician to the Children's Department of the Demilt Dispensary.

* Küchenmeister, pp. 161–2.

℞.—Ol. chenopodii, gtt. x.
Syr. Simp. ℥j.

M.—Cochl. parv. ter in die.

The dose should be continued for two or three days, and then followed up by a brisk cathartic.

To dislodge ascarides of the rectum, we have employed, successfully, an enema composed of *olive oil.* From four to six ounces of the oil should be administered to an adult, and retained as long as possible in the rectum. Young children, who often suffer greatly from the presence of ascarides in the rectum, are frequently promptly relieved by the employment of an enema composed of two ounces of olive oil.

In the treatment of this troublesome parasite, Trousseau and Pidoux have found injections of the biniodide and bi-chloride of mercury extremely effective. To an adult they administer, two or three days successively, an enema consisting of a quart of water in which five centigrammes (about three-fourths of a grain) of the biniodide are dissolved by means of one-tenth of iodide of potassium; or they employ the same quantity of corrosive sublimate without the iodide of potassium. Injections of the following strength may be used with safety:

℞.—Hydrarg. biniodid. gr. i.
Potass iodid.. gr. ss.
Aquæ font. Oij.

M.—Pro enema.

When administered to children, from four to six ounces of this solution may be employed.

These authors say they have rarely failed of success in the employment of either of the above remedies.

They advise a repetition of the enemata in a fortnight afterwards, and again at the end of four or five weeks.*

Report on Fluid Extracts, read before the New York Academy of Medicine, December, 1857. By Samuel Rotton, M.D.

The Academy of Medicine referred to their Section on Materia Medica a large number of Fluid Extracts, and the Section of Materia Medica, after discussing them at some length, referred them to me. As a Committee of that Section, I reported to them, but, for want of time, they could not give the matter that consideration that it seemed to require.

* Traité de Thérapeutique.

The Section have requested me to read the report before the Academy of Medicine at large, as merely the report of their Committee, as they consider the views herein presented too important to be hastily passed over by them.

There having been so many of these extracts referred to me, it has necessarily taken a long time to arrive at any report; and many of them have, in consequence, been left untried. I shall, therefore, only speak of those that have been tested either therapeutically or by analysis.

According to Professor Wood's definition, "Fluid Extracts (Extracta Fluida,) are highly concentrated solutions of the active constituents of medicines, or the active constituents themselves, extracted in the fluid state."

Of these extracts referred to me, the "Fluid Extract of Veratrum Viride" was first examined. I commenced by using 5 drops at a dose, at intervals of half an hour. This producing no effect, I increased the dose to 10 and to 20 at like intervals; and I also took 30 drops myself, without any effect. I then submitted it to analysis, and found a large amount of feculant and inert matter, with about 10 grains only of alkaloid, resinoid, and oleo-resin combined in 3½ ounces.

Four ounces of "Fluid Extract of Jalap" were next submitted to analysis. The dose of this was said to be a teaspoonful, which should be equivalent to half a drachm of Jalap powder, or the 4 fluid ounces of the extract should represent 2 ounces of Jalap root, or 960 grains.

Mr. Blande obtained from Jalap 15 per cent. of resin, and the average yield is 10 per cent; this should yield, therefore, at 10 per cent. 96 grains; but the whole 4 fluid ounces of this extract did not yield a single grain of Jalapin. In 4 fluid ounces of the "Fluid Extract of Jalap," of another manufacturer, purchased by me for the purpose of analysis, I found 5 grains only of Jalapin.

I next tried the "Fluid Extract of Cannabis Indica." Dose said to be "10 to 20 drops, cautiously increased." I commenced by giving a patient 30 minims; it produced no effect, and between 12½ and 8 P. M., this patient took 3½ ounces, without the slightest perceptible effect. On the following night I took, within an hour, the remaining half ounce; it produced no more effect than a teaspoonful of lager beer would have done. As between my patient and myself, we dispatched the whole of this beverage, I had none left for analysis.

I wish to impress upon your memories, that "Fluid Extracts are highly concentrated solutions of the active constituents of medicines." (Wood.)

I used 2 fluid ounces of the "Fluid Extract of Ergot" upon a patient troubled with menorrhagia, without producing any uterine pains; it was given in four equal doses, at intervals of half an hour.

I have found the "Fluid Extract of Rhubarb" a mild aperient in doses of a tablespoonful—the dose recommended being from one to two teaspoonfuls; and the "Fluid Extract of Senna" a mild cathartic, in doses of two tablespoonfuls—the dose being one to three teaspoonfuls.

Ipecac Ext. acted as an emetic in a child, in doses of two teaspoonfuls. Dose directed, from 15 to 30 drops.

I submitted next 30 fluid drachms of "Fluid Extract of Red Peruvian Bark," and the same quantity of the "Fluid Extract of Calisaya Bark," and at the same time with these I submitted to analysis 30 fluid drachms of the "Fluid Extract of Red Peruvian Bark" prepared by another manufacturer, and presented to me by Dr. Gouley. The only formula for Fluid Extract of Bark in the United States Dispensatory, is that recommended by Mr. Alfred B. Taylor, of Philadelphia, and the fluid extract, or inspissated infusion of the London Pharmacopœia (Infusum Cinchonæ Spissatum.) In Taylor's formula, a fluid drachm of the extract represents a drachm of the bark. Of the London extract, excluding all loss, 20 minims should represent a drachm of the bark. Professor G. B. Wood, good authority on all these matters, condemns the use of any bark for pharmaceutical purposes that does not contain 2 per cent. of alkaloids, and they generally do contain between 3 and 4 per cent.

In 30 fluid drachms of Mr. Taylor's extract, at the lowest estimate, 2 per cent., there should be, therefore, 36 grains of alkaloids, and in the London extract 108 grains. In the 30 fluid drachms of the extract presented to me by Dr. Gouley, there were 3 grains of impure alkaloids; and in 30 fluid drachms of the extract of Red Bark, under consideration, there were 15 grains; and in the same amount of their extract of Calisaya Bark, there were 10 grains; and in 15 fluid drachms of the same maker's extract of Calisaya Bark, obtained by me subsequently from the Chairman of our Section, I obtained also 10 grains of alkaloids, but this was from the bottom of the bottle.

Truly, gentlemen, I may now ask, are "Fluid Extracts highly concentrated solutions of the active constituents of medicines?"

Perhaps some gentlemen here may think that, by these remarks, I intend to impugn the honesty of the manufacturers of these preparations. Such is far from my design, as I shall show hereafter. I mean but to find fault with the preparations themselves, and their methods of manufacture, and point out where the error lies.

Plants presenting all the appearance of being possessed of full remedial value, are oftentimes found on analysis to be nearly or quite deficient in any proximate principles. This is a well-known fact, and is spoken of by every author on Materia Medica; and yet, in spite of this fact, a given amount by weight, of a substance differing in its proximate principles in every different sample that is presented, is directed to be prepared with a given amount of menstruum, to form a certain quantity of tincture, fluid, or solid extract. So well is this understood, that for several preparations, Prof. G. B. Wood gives such precautions: "But one caution is here peculiarly important, namely, that when it becomes necessary during the use of these large doses to change the parcel of the medicine, never to use the new parcel so freely as the one last employed, lest it might prove to be much stronger, and thus endanger serious results." And yet Prof. Wood, in spite of this knowledge, directs tinctures, extracts, &c., to be made by weight and measure, with ingredients that he knows to differ in therapeutic and chemical value, and oftentimes to be utterly valueless

Are these gentlemen, then, who follow his directions, dishonest? No! they only, like Prof. Wood, have not yet seen things in their proper light.

Who amongst us can take advantage of Prof. Wood's caution? We write prescriptions, and one day it is prepared by one druggist, and another day by another; one time, the physician is told his medicine is inefficient, and another time he is called in haste, to relieve the danger that has arisen from an over-dose. Both apothecaries have prepared their medicine under the directions of Prof. Wood's Dispensatory, but they are as unlike as winter and summer.

We know that plants, transplanted from their natural soil to one uncongenial to their development, cease to produce an active principle at all, or the active principle is changed in its character. This is a well-known fact with the soda plant, which near the sea produces *soda*, but if transplanted inland it produces *potash* instead. And yet a pound of this plant would be directed, if medicinal, to make a given quantity of extract. The dandelion root, when cultivated in our gardens, almost ceases to produce an active principle, but is largely increased in starch, sugar, and gummy matters. How many plants are there that differ in their character if grown in the North, while they are indigenous in the South. Climate, temperature, soil, and moisture make great changes in the constituents of all plants.

A gentleman informed me some time since, that during a very wet season in the East Indies, he produced much more than an average

amount of opium, but that the opium contained but a mere trace of morphia. I recollect a suit brought several years ago by a manufacturer in this city, to recover the value of a large quantity of opium, from which he could obtain scarcely any morphia; and yet 10 ounces of this opium may be used, and in this instance was used, to make a gallon of laudanum. The Cannabis Indica yields its exudation only in the warm, moist valleys of India; upon the hills the same plant is totally deficient in active principle. Who has not found the leaf of the digitalis so extremely variable in strength, that it has almost lost its place in the Dispensatory?

Who can tell at what period of the growth of a plant to gather, for medicinal use, it leaves, root, or bark? I have tried many experiments with hyoscyamus leaf, and have gathered from the same plant leaves, when it was early in its growth, when it was in flower, and, again, when it was in seed. They all possessed different therapeutical effects. I have tried also conium and aconite with like results. I could say much, did time allow, on this one subject, for it is full of interest; and when this matter is reconsidered, I will endeavor to present to you many facts of great interest.

Plants by keeping become stale, and differ much in their therapeutic effects, from those which are fresher. In fact, plants, commencing from the time when organic activity ceases, are liable to a chemical, destructive composition, whereby the proximate principles, by the reaction of the nutritive constituents, and by the external agency of air and moisture, are decomposed and dissipated, or enter into new combinations.

The methods of preparing fluid extracts from those medicinal plants whose active principle is soluble only in alcohol, give, to say the least, very inelegant preparations; for if the active principles are extracted by alcohol, the menstruum is distilled off, and the fluid extract, if it contains the virtues of the plant, must contain it only in suspension, not in solution, and is liable at any moment to decomposition, and it must be frequently thrown aside as sediment; or if that in the upper portion of the vial that contains it, has been used without being shaken, the lower part may contain all the active principles, and may be given in dangerous, or even fatal doses. The same principle holds good also with those whose active principle is soluble in water, for when it comes to be evaporated down, the water already highly charged with more soluble compounds, as the sugar, starch, gum, &c., refuses to hold more than a given amount in solution; it is therefore precipitated, and is liable to the same objections as before mentioned. And these

watery extracts, as they contain more of the nutritive substances of the plant, are rapidly decomposed, and in their decomposition destroy, or render inert, the medicinal principle.

Many of the fluid extracts, which, if made, should be made with strong alcohol, are prepared with diluted alcohol only, and hence fail in extracting many of the therapeutic constituents of plants; and others, if capable of extraction with diluted alcohol, are not retained in solution when extracted, and even those soluble in water are precipitated upon the evaporation of the water.

Aside from the facts of analysis, there are reasons, *a priori*, why fluid extracts cannot be relied upon to possess uniform therapeutic strength. Even admitting that the plants from which they are prepared are medicinally perfect, it can be shown that the therapeutic constituents are exposed to the same liability to decomposition in the prepared form that they were in the plant. In the preparation of fluid extracts, but little separation is effected of the nutritive from the therapeutic constituents. It is by the reaction of the nutritive substances, aided by air and moisture, that the medicinal substances are decomposed in the plant. This reaction will as readily take place in the extract as in the plant, the usually small quantity of alcohol present being insufficient to resist putrefactive tendency, and even of itself constituting an additional disintegrating agent. The nutritive substances, during the life of the plant, undergo certain transformations, which approximate more and more towards a higher degree of organization; but when the plan dies, there is a change, a retrogressive chemical action, which effects the decomposition of substances already formed. This decomposition results in the reduction of these substances into their elements, when they are either dissipated or enter into new combinations. In extracts, either solid or fluid, the resin and resinoid and neutral principles are liable to complete destruction, while the alkaloids are either held in solution by the acids formed, or form insoluble salts with combining principles; or if the decomposition proceed far, they are reduced into their original elements, and are thus completely lost, and the period required to complete this change varies from weeks to many months.

The objections to these fluid extracts, and extracts of all description, then, are, that they are not and cannot be uniform in their strength, because the plants from which they are taken possess different amounts of therapeutic properties; that they are liable, equally with the plant from which they are compounded, to destructive alterations; that each new parcel or preparation must be tested separately before its thera-

peutic value can be known; in short, that they possess no positive value.

It is only within your time, Mr. President, that the alkaloids were discovered, giving, as in these principles, *positive* characters; and the requirements of the healing art loudly demand that all agents for the cure of diseases become like positive in their character.

In Morphia we have an agent that is positive in its character; but who has used laudanum from a dozen different samples, and found it of the same relative strength? Who has not been disappointed in the sedative effects he wished to produce, and from the variable strength of the agent produced stimulations where he has looked for sedation?

What has been done in extracting the Morphia, the active principle from the opium, may be done with every other vegetable remedy! Nay, sir—*it must be done!* for by this means, and this alone, can a physician know with certainty how much of a medicine he is giving.

Of the therapeutic effects of medicines there may be disputes, but in their pharmaceutical preparations there need not, in this age of chemical advancement, be any room left for cavil; for chemical analysis can at all times settle such disputes, and guide us rightly in the path of discovery.

Do not understand me to say, that I think the alkaloids, and the alkaloids only, to contain the whole therapeutic constituents of plants; this I do not assert to be the case, for many plants have different therapeutic effects from their alkaloids, and do contain several principles which give them their medicinal effects. I merely mean, that the active constituents of plants, whatever they may be, should be so isolated from the nutritive principles as to prevent them from deteriorating, or changing in their character; and as they vary in amount in different specimens, they must be isolated, so that we may know what amount of active principle we are using, and, without the necessity of testing our medicines, know the exact amount to administer.

Since the times of Hippocrates, physicians have been as tenacious of their opinions as we are at this day; and yet, in spite of opposition, truth has gradually gained ground; and there have been as many brilliant discoveries made in medicine as in any other of the arts and sciences; and there has been as much opposition to them as to all other discoveries; but the day has come—because the requirements of mankind demand it—that all medicinal agents shall be made as positive in their character as quinia, morphia, strychnia, or veratria; and our descendants will wonder how we succeeded in curing diseases with such *imperfect remedies*, and will laugh at our pharmaceutical prepara-

tions, as we now laugh at the herbal of old Culpepper, arranged under the influence of the planets.

I have labored hard, Mr. President, for many years, in my humble way, to bring about this improvement, for I have long felt the inaccuracies of the present system, and have tried to remove them. The labors you have thought fit to put upon me have forced out these truths, for I know and feel that they are truths, and like all other truths that are of interest to humanity, they will spread like light.

Notes of Eight Cases, in which large quantities of Opium had been taken, by accident or design—all recovering. By JOHN MCNULTY, M.D. New York. Fellow of the Academy of Medicine.

[Read before the Academy of Medicine, and printed by permission.]

I do not claim for the notes I am about to present, the dignity of a "paper;" they are not offered as such, they are not intended as such, being simply a recital of the notes of cases that have fallen under my personal observation in private practice, in which very large quantities of Opium, in one form or another, were taken. In two of the cases the doses were so incredible, that I should hesitate to state them, (although I fully believe the quantities indicated were positively taken,) had I not read in the October number of the *London Lancet* a paper by Geo. D. Gibb, M.D., on some cases, in one of which ʒxii. of laudanum were taken, and retained 9 hours in the stomach, without symptoms of poisoning to any great extent, the patient recovering under slight treatment. Dr. Gibb quotes in his paper the case related by Dr. Christison, in which ʒiii. of laudanum were taken in two equal doses one hour apart; stupor did not set in until the 18th hour, and in two hours more symptoms of poisoning were of an alarming kind. He also quotes the case related by Dr. Taylor, of a medical student who swallowed ʒiv. of laudanum, at 9 P.M., went to bed, slept till 6 A.M. next morning, when he vomited, and recovered without any treatment.

These cases encourage me to report those that I have seen, though I have hesitated to do so on account of the apparently improbable statements they contain.

Case I.—A woman living in Greenwich Street, near Cedar Street, Mrs. B———, aged about 30, married, unhappy in her domestic life, attempted suicide by laudanum. She took at 10 A.M., (as she afterwards informed me a six-pence worth, on inquiring at the drug store

I found it to be ℥j,) ℥j. of laudanum. I was called at 3 P.M., 5 hours after the laudanum had been taken. She had not vomited, stupor well marked, pupils contracted; she articulated when roused like a drunken person; I gave her a large dose of sulph. zinc, in warm water; vomiting soon followed of a liquid having the color of weak coffee, and a strong odor of laudanum. I gave warm water freely, keeping up the vomiting as long as desired; then I gave strong coffee, constant exercise, &c. She recovered.

Case II.—I was called to see the child of a German grocer, in Greenwich Street, near Fulton Street, aged 9 months, suffering with catarrh, and severe cough. I ordered an expectorant mixture, in which I desired to give ℥j. of laudanum, in the proportion of ♏ ij. in each teaspoonful, which was to be given every two hours. In making out the prescription I wrote the character ℥. instead of the ℥., thus giving ♏ xvi. instead of ♏ ij. at each dose. This was bad enough, but to make bad worse, the father of the child thought the time between the doses too long, so he gave it every half hour; the child had taken four doses, when the mother became alarmed and sent for me; I saw the child 3 hours after it had taken the first dose; it had now taken ♏ 64 of laudanum. Symptoms of poisoning had set in, no vomiting had occurred, nor could it be produced to any extent by the means used for that purpose, (I did not use the sulph. zinc;) external stimulation with spts. camph. was kept up for some hours, the child was frequently shaken and roused as much as possible, and recovered.

Case III.—A jeweler, in Greenwich Street, near Courtlandt Street, aged 53, who had been on a hard spree, took ℥ij. of laudanum, and half a pint of common alcohol. Time of taking it unknown, probably about one hour before I saw him. I found him perfectly insensible, all the symptoms of poisoning by Opium well marked; I pried open his mouth, and used the stomach pump; I pumped in strong coffee and washed the stomach out clean with the coffee, then threw in more coffee, and allowed it to remain, kept him moving around, used external stimulants and friction, and as he began to rouse up I gave him oyster soup, freely, and more coffee; he recovered, but two years afterwards committed suicide by laudanum, during my absence from the city.

Case IV.—A man, 45 years of age, native of Canada, stopping at the Jersey Hotel, in Courtlandt Street, had been dissipating desperately for three weeks. He determined to commit suicide, and when I saw him first he was in a drug store, questioning the clerk about their sulphate of morphia, saying that it was either impure, or that they had

deceived him by selling him something else than morphia the day before. To prove that the drug was pure, and that they had not deceived him, the clerk got the bottle from which he had sold him 25 grs., (good weight, for when he bought it they supposed him to be a country physician, he having asked for it so off-hand,) and told him he could have the article tested. He then asked how much it would take to kill a man. This frightened the clerk, and he asked why the inquiry was made. The man replied, because he had taken the whole of the morphia he had bought of him the day before, for that purpose, at 9 o'clock on going to bed, (this was at 10 A. M., of the following day,) and that it had no effect; and further, that he had bought 15 grs. two days before for the same purpose and taken it, without any effect, but he did not believe it was morphia, although it tasted bitter, the same as that which he had bought of them. I could not believe this man's story, he had none of the symptoms of poisoning by opium; he had that wild, restless look and action of a man at the beginning of delirium tremens; I questioned and cross-questioned him; I took him to my office and talked with him a long time on other subjects, gradually and indirectly referring to the subject, but he persisted that he had really taken the whole of the morphia, and described the minutiæ of how he prepared it, its taste, &c. &c. I went to his hotel, found the paper labelled morphia, found a tumbler with a few drops of clear liquid in it having the intense bitter taste of morphia; I examined all the vessels in the room, and he certainly had not vomited in the room; he said he had not vomited at all, or been to the water closet, and on making inquiries of the employees about the house this appeared to be true. I again exercised my ingenuity in questioning him, but he still affirmed that he had taken it; and further, that he would yet commit suicide, and he certainly did make at least two, and I believe, three attempts at suicide by drowning, as the police records will show, within one month from that time. After his first attempt by drowning, I had him arrested as a lunatic, but some of his drunken companions got him released in a day or so, and after he had escaped death by his own act, in many ways, some person succeeded in getting him out of the city and back to his friends. I took a sample of the morphia to Dr. Bailey, late Drug Inspector, (it was manufactured by Powers & Weightman, of Philadelphia,) he examined it and pronounced it pure. Powers & Weightman heard of the case and wrote to me for all the facts connected with it; I complied with their request. The circumstances were so strong that they were satisfied that the man had positively taken the 25 grs. In their

reply, they stated that their chemist, (a German,) had known of two or three cases in Germany, in which nearly as large doses were taken for the same purpose, with like results. If this man did take the 25 grs. of morphia, we see that a condition of system may exist, in which the equivalent of 150 grs. of opium, taken at a single dose, may not produce death or symptoms of poisoning. This man received no treatment.

Case V.—A prostitute, aged about 22 years, took ʒii. of laudanum at 6 P. M., for the purpose of suicide. I was called at 10 P. M.; stupor was well marked, pupils contracted, &c., &c. I gave her a large dose of sulphate of zinc, in warm water; vomiting of a brownish liquid, having the odor of laudanum, followed almost immediately. Vomiting kept up by warm water, patient constantly exercised; in a short time I gave strong coffee, and the woman recovered.

Case VI.—The next day, while in a drug store, a woman about 50 years of age came in, acting strangely; the proprietor, supposing her intoxicated, was about putting her out, when I happened to notice the peculiar expression so marked in persons under the poisonous effects of opium. On closer examination, I became satisfied she had taken opium in some form with suicidal intention. I gave her a large dose of sulphate of zinc, in fact poured it down her throat, as she would not drink. I tickled the fauces with a feather; she soon vomited a quantity of brownish liquid, having a strong smell of laudanum; I gave her warm water, which vomited her more. I then gave her some bitter tincture, (I think quassia,) in water; she was kept constantly moving, and eventually recovered. The quantity taken was not known, or the time that elapsed; I supposed the quantity to be about ʒii., judging only by the appearance of the discharges from the stomach.

Case VII.—Mrs. ——— had suffered a severe domestic bereavement, which was followed by an attack of illness, lasting for about 10 days. When convalescent, she got into a carriage for a ride; while out she bought at Rushton's drug store ʒvi. of laudanum, they supposing she wanted it to keep in the house for family uses, her respectability removing all suspicion of suicide. At 9 P. M. she went to her room, prepared for bed, drank the laudanum, threw the bottle into the back yard of the next house, which was unoccupied, went to bed and to sleep. The next morning, at breakfast time, the servant went to her room, but finding her asleep, as she supposed, went away; about 10 A. M. the servant went again to her room, finding her the same spoke to her, but, getting no answer, she shook her; when this

did not rouse her the servant became frightened, alarmed the family, and I was sent for. I arrived at 11, A. M.; found the patient in deep stupor; she had not vomited. The symptoms were so striking, that I at once suspected poisoning by opium. She could be slightly roused by violent shaking and speaking in a loud, sharp voice. I poured down the throat a large dose of sulphate of zinc, tickled the fauces with a feather, kept shaking the patient, and in about 10 minutes she vomited at least a pint and a half of liquid, the color of *strong* coffee, and having a very *rank* odor of laudanum. The sulphate of zinc was repeated; further vomiting followed, having a strong smell of laudanum; the vomiting was kept up with warm water, the patient constantly moving around. Strong coffee was now given; at first it was vomited, but after a short time the stomach became quiet, and consciousness returned in a great measure at the end of an hour's treatment; enough so that she gave me the entire history of her getting the laudanum, when and how she took it, and what she had done with the bottle, &c. She recovered. As strange and incredible as this case appears, I firmly believe it is true to the letter. 1st. Because the lady made precisely the same statement of all the facts in the case when consciousness had only in part returned, that she has ever since made, and I have talked with her often on the subject. 2d. I went into the yard of the next house, and in the precise part where she said it struck in the grass, I found a ℥vi. bottle, labelled laudanum; the label was Rushton's; the bottle was corked up; it contained a few drops of liquid; I had it tested; it proved to be laudanum of full strength, ♏ xix. gave gr. i. of opium. 3d. I thoroughly searched every vessel and all parts of the immediate premises, but no traces of laudanum, (except a stain in the bottom of the tumbler out of which she had drank the laudanum,) or anything indicating that the laudanum had been spilt, spit out, or vomited; in short, every evidence, except personal observation, go to show that she did positively drink the ℥vi. of laudanum 14 hours before I saw her.

Case VIII.—A gunsmith's child in Fulton Street, aged one year; the mother gave it a *large* teaspoonful of laudanum, by mistake, for syrup of ipecac. Forty minutes after I saw the child; it was drowsy, but could be roused without much trouble. I gave the syrup of ipecac freely, as it was at hand, and ordered sulphate of zinc. The ipecac vomited but slightly; when the sulphate of zinc came I gave it in warm water; free vomiting followed immediately. I then gave strong coffee, which was also vomited at first, but was soon retained, and the child recovered.

It will be seen that six of the eight cases were attempts at suicide, and that in all of them large quantities of opium were taken, the smallest quantity being ʒi. of laudanum; the largest 25 grs. of sulphate of morphia in one case, and ʒvi. of laudanum in another. In four of the cases the time between taking the laudanum and when medical assistance arrived is known, viz., 5, 4, 13 and 14 hours. One of the cases appears so improbable, from the quantity taken, and the fact that no poisonous effects followed it, (although he received no medical treatment,) that I have often asked myself the question, was I not, in spite of all my questioning, caution, and examination, deceived? But, on reflection, I am compelled to answer I do fully believe it was really taken; and since the case has occurred in which ʒvi. of laudanum was taken, I am more confirmed in the belief that it is possible for a man, coming out of a long drunken frolic, to take 25 grains of sulphate of morphia and experience no poisonous effects from it. I am unable to give any explanation, that is perfectly satisfactory to myself, why death should not have resulted in both of the cases in which such unheard-of doses were taken, especially when the time that had elapsed after taking the drug, and before medical relief was obtained, (in one no treatment was received,) is taken into consideration. All the patients I have had who have attempted suicide, (except case iv.,) have used opium in some form as the agent.

I wish to make one remark on the use of sulphate of zinc as an emetic in these cases. My rule is to give it in large doses—by that I mean doses of ʒi. or over. My reasons are, 1st, to insure greater certainty of action, as I suppose the safety of the patient depends on removing the opium from the stomach, and I know of no agent so certain as sulphate of zinc in large doses, given in warm water. I have never seen, nor do I fear the poisonous effects, attributed to zinc in works on toxicology. I believe the magnitude of the dose, in a measure, carries protection with it, especially so when we consider the after-treatment; and further, the stomach is so profoundly under the influence of the opium, that I believe the danger of poisoning by zinc is greatly lessened in these cases. Finally the urgency of the case calls for heroic treatment.

In conclusion, I would respectfully ask, have we not somewhat over-estimated the poisoning qualities of opium? If not, I would ask, what is the peculiar condition of system, or under what circumstances, and why is it, that the system is enabled at times to withstand such monstrous quantities of opium?

A Case of unusually large Development of the Human Fœtus. By CHARLES A. BUDD, M.D., Lecturer on Obstetrics in the New York Medical College, Fellow of the N. Y. Academy of Medicine, &c., &c.

Upon referring to the different accepted authorities on the science of Obstetrics, we find, as the average, the following dimensions accorded to the full-grown healthy fœtus at the full period of utero-gestation. *Length* from the crown to the heel, between 19 and 20 inches. *Weight* rather less than seven pounds; and from a large number recorded by different observers, it is now an accepted fact, that as a rule, male infants are, at birth, a trifle longer and heavier than female. Cases of extraordinary development have from time to time been brought before the notice of the profession. For instance, Beaudelocque reports having seen one child which weighed, at birth, *thirteen* pounds, and another twelve. Sir Richard Croft reported an instance to Dr Ramsbotham, Jr., of an infant born alive, weighing *fifteen* pounds; and Ramsbotham, the elder, is stated to have delivered a woman of one weighing *sixteen and a half pounds* avoirdupois. Mr. Bloxam relates a case in the *London Lancet*, where he delivered a child by the forceps, which weighed *seventeen pounds and twelve ounces*, and whose length was *twenty-four inches*. This last is, as far as I have been able to ascertain, the largest one on record. The following case I extract from my note book, as being (in my opinion) sufficiently interesting to be placed upon record. I was called on the morning of February 19th, 1857, at five o'clock, to see Mrs. L., in consultation with Dr. Sitler, of this city, in labor with her eighth child. I ascertained from the doctor that she had been in hard and vigorous labor since ten o'clock the evening previous without any advance being made in the head, which was presenting. I also ascertained that her previous labors had all been tedious and severe, although they had terminated without the interference of art. The uterine contractions were as severe as any I have ever witnessed, and, upon making an examination, I found the pelvis well formed, though of somewhat smaller capacity than the average—the head, as I have said, was presenting—having engaged at the superior strait in the "*right occipito iliac anterior*" position, and was *but slightly, if at all flexed;* in fact I could, with two fingers in the vagina, distinctly recognize both fontanelles, so that the *occipito-frontal* diameter of the fœtal head was parallel with the right oblique diameter of the superior strait. I immediately applied the long forceps and endeavored to flex the head, and thus suffer the mechanism of labor to go on undisturbed; but, after repeated trials, I found it a physical impossibility

to make the slightest impression upon it, so thoroughly had it become wedged. Fearing rupture of the uterus, I perforated and extracted with the crochet a fœtus of the following dimensions:

Length, $23\frac{1}{2}$ inches. Weight, (without the brain,) a trifle over 12 pounds; bi-trochantèric circumference, $3\frac{3}{8}$ inches; bis acromial circumference, $16\frac{5}{8}$ inches; occipito-frontal circumference after the entire encephalon had been evacuated, nearly the whole of one parietal bone gone and all the sutures overlapping, $14\frac{1}{4}$ *inches*. I have neglected to note, and my memory does not serve me as to the sex of the child.

143 East 13th Street, *New York, Feb. 13th*, 1858.

On a Substitute for Human Milk. By William H. Cumming, M.D.

Artificial lactation is the subject of this paper. In order to prepare our minds for its proper consideration, it will be well to examine the natural function in its normal state.

Lactation exists as a function only among the Mammalia. These derive their title as a class from the existence of the organs of this function. Whether they spend their lives in the water or on the land, whether they swim or creep, or walk or climb, or fly, they all have milk-producing organs; they all suckle their young.

And yet there are foreshadowings of lactation far down the scale of being. The bees and wasps and ants prepare a supply of food for their young, and the larva on his emergence from the egg, finds this provision near at hand and amply sufficient for his wants.

Many birds bring insects and worms to their yet unfledged young. The swallow and the wren are familiar examples of this. Nothing can exceed the diligence and assiduity with which they devote themselves to this important work of artificial lactation. The pigeon comes still nearer to the mammalia in this matter, for it supplies to its young an abundance of partly-digested food. The fact has not escaped notice, and "*pigeon milk*" is the name of this article of diet.

The truth is, that most animals leave the egg or the womb in a state of development in which they are unable to obtain and use the ordinary food of their kind. In most cases their organs of locomotion do not enable them to obtain this food. The larva of the bee cannot fly, the puppy cannot walk, the monkey cannot climb, the beaver cannot swim. Nor can they in most cases masticate and digest such food as their parents use. The teeth are ordinarily still within the gum, and do not appear for some time after birth. Most of these

animals, therefore, absolutely require for their sustenance and growth a peculiar food suited to their actual condition.

What then is lactation? It is the secreting from their own blood, in organs then and then only active, and the furnishing to their new-born young, a liquid food suited to the various degrees of their development at birth, and the continuing to furnish the supply, until the young animal has become able to use the ordinary food of his race.

This secretion is continued much longer in some animals than in others. The young are not born in the same state of development. The young of the Marsupials leave the womb while yet in an embryotic state. The ruminants stand at the other extreme. Between these the other orders range themselves. In order to fix this fact in our minds, let us compare those animals with which we are most familiar. Compare the rat, the puppy, the kitten, with the colt, the lamb, the calf. Blindness, weakness and deformity mark the former; while the latter are able to see and hear and walk. How soon do the young ruminants follow their dams, skipping and running as they go. The states of development at birth are thus seen to vary greatly.

The nature of the future food of the young animal has an important connection with the length of lactation. The digestion of grass and grain and roots requires more gastric energy than that of worms and insects and flesh. In conformity with this, is the fact, that the graminivorous animals furnish milk to their young until the latter are very much more developed than the carnivora are when they are weaned.

We have used the word Milk. What is Milk? It is a general term for the various products of the mammary glands of different animals. It is the name for the food furnished by these mothers to their young. Milk is a white, opaque, oily liquid. Its color is not pure white, but verging on yellow. In some animals it is sweet, containing notable quantities of sugar. But in all it contains three great constituents—butter, cheese and water.

We have said that milk is suited to the wants of the young animal. It consists universally of two classes of food; oily materials containing no azote, and caseous substances holding in combination mineral salts, and admirably adapted to the growth of the body.

It is suited to the wants of the young animal. What is the first want of a new-born animal of this class? Warmth. He has been, during the previous stage of his existence, surrounded by tissues of the temperature of 100°. He is now out in the open air, or in still colder water, the heat of his body rapidly radiated or conducted into

these cooler media. This loss of heat does not lower his temperature, for there is an internal supply. At the moment of his birth, respiration commenced, and the oxygen of the air combining with the oil of his body, evolves heat sufficient to replace that which is lost. But this consumption of oil cannot be long continued, unless the supply be renewed. The body will be soon reduced to a state of extreme emaciation, and death from cold must follow.

A supply of oil is then the first want of the young animal. The lamp of life must be fed, or it will speedily go out. The milk contains oil in proper proportion for this purpose. This oil is butter.

But not only must the vital heat be maintained, the tissues of the child must grow. The materials for the growth of the tissues are supplied by the casein or albuminous portion of the milk. The name casein is applied to a group of substances having an almost identical chemical composition. Indeed it has until recently been supposed to be identical. But it has been ascertained by Quevenne, that while their organic composition seems the same, they hold in combination different proportions of mineral insoluble salts. Thus, phosphate of lime (the bone earth) exists in different proportions in suspended casein, in dissolved casein, in albumen, and albuminose. These four substances also differ in the effects produced upon them by different agents. Thus, while suspended casein is coagulated by a small quantity of rennet, the dissolved casein, the albumen, and the albuminose are unaffected by it. Thus, while the albumen is coagulated by ebullition of the milk, the other three constituents of the casein are unaffected. Nitric acid produces the same effect without the agency of heat.

In the present state of our knowledge on this subject, we can only say that these four substances, by the action of the gastric juice, seem to be all converted into albuminose, and to be in this form absorbed into the system.

Thus constituted, having both azotised and unazotised elements, the milk is suited to supply the wants of the animal, and to promote his growth and development.

These general statements concerning lactation are applicable to the function as existing in the woman. An element which is not universally but very generally found in milk, exists in human milk in the proportion of 0.075, we refer to the sugar. Of the uses of the sugar we are not so well informed. There is reason to believe that it contributes principally to the maintenance of the heat of the body.

We come now to the subject of artificial lactation. Sometimes by

the death of the mother, more frequently by her failure to secrete enough milk, the child is deprived of the needed supply. Something must be done for the famishing infant. In a few cases, we may have recourse to another woman for the needed food. Few good nurses, however, can be found. In the cities, there are by no means enough to supply the demand for human milk; in the country, they can scarcely ever be obtained. In this country we can find no permanent, reliable supply of milk, except that furnished by the cow. The question is, Can artificial lactation be successfully performed by means of the milk of the cow? This is a question of great interest to medical practitioners, as well as to parents.

In using cow's milk as a substitute for the natural food of infants, great difficulties are found. These arise from the difference of composition of the two kinds of milk—thus:

Cow's Milk is composed of		*While Human Milk is composed of*	
Butter,	38.59	Butter,	20.76
Casein,	40.75	Casein,	14.34
Sugar,	53.97	Sugar,	75.02
Water,	866.69	Water,	889.88

If we so dilute cow's milk as to reduce the butter to 20.76, we shall have 21.92 of casein, or 50 per cent. more than in human milk. This excess of casein leads to serious indigestion, with consequent gastric and intestinal disorders.

If, on the other hand, we reduce by still farther dilution the casein to 14.34, we shall have only 13.58 of butter, or less than two-thirds of the proper proportion. This deficiency of butter does not produce such immediate disturbance as we have stated to follow the excess of casein, but its permanent influence is most injurious.

First, because there is a deficiency of the material needed for the production of heat. If the temperature of the body be lowered, all the functions languish, and the child is unable to resist the hurtful influence of atmospheric changes.

Secondly, this deficiency of butter implies a corresponding deficiency of the phosphureted oil (lecithine) of the milk, the proper and peculiar nutriment of the nervous system, which exists in butter in the proportion of 8 per cent. or one-twelfth. If there be a deficiency of one-third of the butter, there will be of necessity, a corresponding deficiency of one-third of this phosphureted oil. As the child, during the first year of his life, should take from 1,000 to 1,400 lbs. of milk containing from 20.76 to 29.06 lbs. of butter, the annual deficiency of this phosphureted oil would be from 0.5536 to 0.7749 lb.; that is, from nine to twelve ounces. The natural consequence of this defi-

ciency of *nerve food* is failure of *nervous energy*, and imperfect performance of *nerve functions*. The various processes languish, and calorification, circulation, absorption, digestion and secretion all feel the depression.

The proper remedy for these evils, is to provide a milk much richer in butter than the ordinary milk of the cow. If we leave a quantity of cow's milk at rest for four or five hours, and then carefully remove and examine the upper third, we find that it contains about 50 per cent. more butter than at first. In round numbers, the butter is to the casein as 57 to 40, or as 100 to 70. Now this is the relation between these two substances in human milk. If we then so dilute this new milk as to reduce the casein to 14.34 thousandths, we shall have 20.76 thousandths of butter. This is just what we need (with the addition of sugar) as an accurate imitation of human milk, and, therefore, a good substitute for it.

Take, then, ordinary cow's milk and let it stand for four or five hours. For a child three months old, $2\frac{1}{4}$ quarts will be needed. Take the upper third, ($1\frac{1}{2}$ pints,) and add to it $2\frac{1}{4}$ pints of water; sweeten it with the best sugar, of which $2\frac{2}{3}$ ounces will be required. It should be made somewhat sweeter to the taste than ordinary cow's milk.

A child three months old will take from 48 to 60 fluid ounces, daily, in six or seven doses of a half pint each.

It should be given from a bottle—*suction being the only proper mode of feeding for a young child.*

Its temperature should be from 100° to 104°. It should be warmed again if it becomes cool while the child is taking it.

The child should be early trained to pass 6 or 8 hours at night without feeding.

The kind of bottle, which for cheapness and convenience is most advantageous, is a plain 8 ounce vial, of an elliptical form. The artificial nipple is best made by rolling a quill in soft muslin and forcing this into the neck of the vial, leaving about three fourths of an inch projecting from the neck. The ease with which the muslin may be unrolled and thoroughly washed, gives this arrangement a superiority over every other, especially in warm weather. The quill also may be readily cleaned.

The child should be fed at intervals of three or three and a half hours. Regularity in this respect is very advantageous.

During the first month, the child needs food of different composition. There should be more butter in proportion to the casein. In

order to obtain this increased proportion of butter, let the upper *eighth* of the milk be taken instead of the upper *third*. This milk contains from 70 to 80 thousandths of butter. It should be diluted with 2.6 parts of water.

For a child from	3	to	10	days	old.	Milk 1000	Water 2643	Sugar 243
" "	10	to	30	"		"	" 2500	" 225
" "	1	month	old.			"	" 2250	" 204
" "	2	"				"	" 1850	" 172
" "	3	"				"	" 1500	" 144
" "	4	"				"	" 1250	" 124
" "	5	"				"	" 1000	" 104
" "	6	"				"	" 875	" 94
" "	7	"				"	" 750	" 84
" "	9	"				"	" 675	" 78
" "	11	"				"	" 625	" 73
" "	14	"				"	" 550	" 67
" "	18	"				"	" 500	" 63

By thus gradually diminishing the proportion of water, we furnish the child a milk containing an ever-increasing proportion of nutritive matter.

How long should artificial lactation be continued? The only answer to this is, "until the child has become able to use ordinary human food." The child should be fed with milk until his organs of mastication and his powers of digestion render it best for him to have other food. And at what age does this condition exist? Children vary so much in the rate of their development, that no answer can be given applicable to all cases. In a vigorous child the first dentition is usually completed at two years of age. Sometimes this appearance of the full complement of teeth takes place six months earlier, and sometimes six months later. Whenever this first dentition is completed, the child has the full masticating apparatus of childhood, and may receive other food than milk. In many cases, lactation must be continued until the age of three years. And it may be safely presumed, that no food will be found so suitable for the tardily-developed child as that which divine wisdom has prepared for the purpose of promoting this development. As an article of food for adults, milk is of great value. Entire races of men rely upon it, and it seems, when thus largely and permanently used, to promote strength and vigor. For the formation of teeth and bones, its phosphate of lime is indispensable, and no other food suited to a feeble child contains so much in intimate union with organic elements.

Nothing has been said of any other mode of artificial lactation. This omission is not accidental. The truth is, that milk is *the only*

material that inspires or even warrants any hope of real success. By this is not meant to say that all children reared otherwise die, but that good, physiologically good results do not follow the use of any other food. Children may *survive* months of arrow-root or other farinaceous food, but a normal, healthy, happy, vigorous, steady, ever-advancing development was never yet attained in this way. The human stomach has no creative power. The materials must be furnished, or the building cannot rise. Lecithine must be given, or the nervous energy declines. Without phosphate of lime, how shall the teeth and bones be made?

If we examine the constitution of the blood, we shall find what materials go to make the human body. What are these? Oxygen, hydrogen, carbon, azote, chlorine, fluorine, iodine, sulphur, phosphorus, silicon, potassium, sodium, calcium, magnesium, iron and manganese. Of these sixteen substances, all are found in milk. And not only so, but they exist in the milk in the same combinations as in the blood. Not only have we chlorine and sodium, but we have chloride of sodium; not merely phosphorus and calcium, but phosphate of lime already prepared for use. Not only have we oxygen and hydrogen and carbon, but we have ten different oils already existing in the milk. We have four different protein compounds, each holding in combination a definite proportion of phosphate of lime. Thus, and in all probability thus only, can this invaluable, but insoluble salt be introduced into the tissues, and give strength and firmness to the frame. Why, then, with this evident adaptation of milk to the development of the body, should we look for other articles of food? Among all the substances now used, none can make any such claim. Indeed, it may be safely said, that milk is an article standing alone, prepared expressly for this one purpose, and challenging all competition.

If the attempt made in this paper to show that the milk of the cow may be so modified as to suit the peculiar wants and condition of the infant, has been at all successful, there is ground for hope that much suffering may be relieved, and many lives saved. The subject is one of great importance, and demands the earnest consideration of the medical profession. To them the eyes of anxious and sorrowful parents are turned for help; if aid can be given, let it not be withheld.

REVIEWS AND BIBLIOGRAPHY.

Ozone, or Chemical, Meteorological, Physiological, and Medical Researches into the Nature of Electrized Oxygen. By H. SCOUTETTEN, Professor of Medicine, Chief Physician of the Military Hospital at Metz, &c., &c. Paris: Victor Masson. 1856. pp. 287.

In 1839, Professor Schœnbein had his attention particularly directed to the odor which oxygen liberated in the electrolysis of water possesses. He had previously noticed the peculiar odor which is developed in the passage of static electricity through atmospheric air. Van Marum, in the 18th century, had also noticed the latter fact, having experimented with the view of ascertaining what effect a series of electric sparks would have upon oxygen gas, and he announced, as his conclusion, that this odor was most certainly that of the electrical material. Schœnbein believed at first that the odorous substance was a member of the class of bodies to which chlorine and bromine belong; that it was a new elementary substance, and he named it *ozone*, from the Greek word ozo, to smell. Later, he announced that he had decomposed nitrogen, and found that it was formed of hydrogen and ozone, and this error resulted from the circumstance that he found phenomena attendant upon an examination of the new substance which really resembled those of a nitrogenous compound.

Osaron showed that the same effects were produced by the ozone existing in the atmosphere, naturally, and by that which was formed from the action of electricity. Williamson, however, asserted that this could not be so, declaring that ozone, when decomposed, furnished water and hydrogen gas, and hence it must be a degree of oxidation of hydrogen greater than water. He endeavored to show that the substance which was formed by the action of electricity in the air was simply nitric acid; and Davy had already shown that electric action would produce this acid. About the same time, Schœnbein relinquishing his idea that ozone was a nitrogenous compound, came to the conclusion that it was a peroxide of hydrogen. Marignac combatted this idea, in a letter written to Dumas, March 10th, 1845, advancing the conjecture that the substance was simply oxygen; and De La Rive confirmed this in a letter to Arago, April 28, of the same year. The latter had produced ozone by passing a succession of electric sparks from an ordinary machine, through a tube filled with pure and perfectly dry oxygen. Berzelius then advances the opinion that it was oxygen in a peculiar condition, not unlike the allotropic character which other substances in chemistry are know to possess.

Such was the state of opinion when the researches of Fremy and

Becquerel gave the world a more satisfactory account of the nature of the substance, free from the charge of mere conjecture. The problem they undertook to solve was this—whether a volume of "pure and dry oxygen gas could, under the influence of electricity, be converted into a substance completely absorbable by iodide of potassium and by the different metals." They showed, first, if galvanic electricity possesses sufficient force, the oxygen gas eliminated in an electrolysis is possessed of a powerful odor. Paper, which had been dipped in a solution of starch and iodide of potassium, was placed in a tube filled with oxygen so that the points of wires connected with an universal excitor should be on both sides. A bluish coloration was immediately the result; when the tube was filled with oxygen, no such result was obtained. The oxygen employed was derived from different substances in the laboratory as its source, and was submitted to the action of the most energetic purifying agents before it was experimented upon. Caustic potassa and sulphuric acid were employed, and the oxygen was also made to pass through a tube of porcelain at a red heat. But after all these purifications, when it was submitted to the electric spark, it soon assumed a peculiar odor and an exceedingly energetic oxidizing power. After the oxygen had been electrized, if brought into contact with a solution of iodide of potassium, a moistened slip of silver, or mercury moistened, rapid oxidation ensued, and the absorption of the gas was completed in a few hours. Scoutetten contrived a series of experiments to show that neither oxygen nor electricity, separately, had any action on the iodide of potassium. The results of the experiments of Fremy and Becquerel, along with those of Scoutetten, are satisfactory as to the chemical nature of ozone being simply electrized oxygen; and though the original name is retained, yet no one advocates the theory that gave rise to the name, viz., that of its being a new elementary substance.

Ozone can be best artificially prepared by placing a small quantity of water in a glass jar or balloon, and then laying a few sticks of phosphorus in the water, so that one half shall be under it and one half exposed to the air. The vessel being imperfectly closed, the temperature is to be raised to about 60° or 80°. When the operation is complete, a peculiar odor will be recognized. The vessel can then be reversed in a vessel of water so that the phosphorus can be removed and the gas washed. The vapors of phosphorus have combined with a portion of the atmospheric oxygen present, and formed hypophosphoric acid, which dissolves in water; "this chemical combination gives rise to the disengagement of electricity, which then acts on the

remainder of the oxygen of the air, and produces ozone." The air in the vessel must be of the ordinary barometric pressure; if compressed so as to occupy but one fifth or one sixth of its original volume, there will be no ozone formed unless the temperature be elevated. Olefiant gas and nitrous vapors prevent its formation. Rarefaction of the air, or of the oxygen used, ensures its speedy formation. Hydrogen gas acts in the same way; and if a mixture of four parts of hydrogen and one of oxygen be employed, as moist as possible, at 76°, the formation of ozone takes place so rapidly that the phosphorus is ignited and the mixture made explosive.

Ozone is a colorless gas, with a nauseous, penetrating odor, which is recognized as the same given off during the use of an ordinary electric machine, and so closely resembling that of burning phosphorus. It is the most powerful oxidating agent known—oxidating moist silver and mercury in the cold, decomposing a solution of iodide of potassium, and causing it to acquire a very marked yellowish tint. These effects require moisture as a necessary condition; without it, they will not take place. If ozone is passed through a tube heated up to 482° F., it is entirely destroyed. It destroys organic coloring substances promptly, as well as ligneous and albuminous substances; combines with chlorine, iodine, and bromine, and forms chloric acid, &c. It *destroys* sulphureted hydrogen, seleniureted hydrogen, &c., and converts sulphurous acid, nitrous acid, &c., by oxiding them into sulphuric, nitric acid, &c. It affords a precipitate in an alcaline solution of the peroxide of lead; decomposes rapidly all the salts of the protoxide of manganese, producing the peroxide, whence a slip of paper saturated with a solution of the sulphate of the protoxide of manganese may be employed as a test of its presence. Ferrocyanide of potassium is converted into ferricyanide by its action. Many of the metallic sulphides are converted by it into sulphates. It is rapidly absorbed by albumen, casein, fibrine, blood, &c. It destroys all oxidizable miasms, and is the most powerful of all disinfectants. Physiologically, "it excites the lungs, provokes coughing and a sensation of suffocation, and is, in sufficient quantity, a substance deleterious and sufficiently toxic to occasion death."

The best re-agent for the determination of ozone in the atmosphere, is paper saturated with starch and iodide of potassium. Scoutetten gives minute directions for the preparation of these ozonometric papers. From 100 to 200 grammes of distilled water are employed as the solvent of one gramme of iodide of potassium; ten grammes of pulverized starch are then added, and the mixture of the solution with the

starch is effected by stirring with a glass rod. The mixture, in a porcelain capsule, is then placed on a slow fire and stirred until it assumes the characteristics of liquid glue. Sweedish filter-paper is now to be procured, and the test mixture may be applied with an ordinary brush, and when the paper is dry it may be cut into strips four inches long and one inch wide. A better method of preparing the test paper, is to have it cut into bands, one inch wide, and fastening a noose of thread at each end to draw the paper through the mixture. It should then be drawn between two glass rods, held slightly separate, so as to remove the superfluous material, and be dried on glass rods in an apartment perfectly free from dust. The paper should be preserved in a box or air-tight jar. When thus preserved it is not injured by age, unless the starch should scale and fall off.

There are objections to the employment of filter paper, based upon its unevenness and the readiness with which it may be torn. Hence, Scoutetten prefers ordinary letter paper, especially that which has been glazed. This he first soaks for 12 hours in a solution of iodide of potassium, (one gramme to 100 of water,) and after drying applies the mixture just mentioned. If the rags of which the paper is formed have been bleached by chlorine, a small quantity of this agent will remain in the paper and will produce a slight reaction on the iodide, resulting in a delicate reddish tint. This, however, will not modify the action of the ozone on the iodureted starch paper, although it is always better to have paper free from chlorine.

Paper thus prepared, when exposed to an ozonic atmosphere, soon shows an alteration of color, becoming first yellow, then acquiring a darker shade, until finally, if there be much moisture in the air, it becomes blue. Circumstances may arise, in a dry atmosphere, when it will be necessary, after the paper has been exposed for some time, to immerse it in distilled water before the coloration will be produced.

The chemical nature of the coloration consist in the oxidation of the potassium by the ozone; the iodine being set free, at once forms the blue iodide of starch. When paper is dry the color fades, owing to the evaporation of the iodine, but may be restored again by immersing it in water, as in this way a new quantity iodide of starch is formed.

In order to demonstrate the quantity of ozone in the atmosphere, Schœnbein has prepared a scale of 11 colors, ranging from 0 to 10, from white to a bluish purple, which he calls an *Ozonometer*. By comparing the discoloration undergone by the exposed paper, with this scale he obtains the *ozonic* capacity of the atmosphere at any time.

In the conduct of ozonometric observations "a slip of the prepared paper is suspended in a sheltered place where the air has free access, protected from the rays of the sun, and as far as possible from privies, *(lieux d'aisance,)* and other places where vapors are evolved, which are destructive of ozone." The slips are exposed for 12 hours, after which they are plunged in water. The amount of coloration is then determined by comparison with the ozonometer and is registered. It is recommended that two observations be made during the day; one between 6 A.M. and 6 P.M., and the other from 6 P.M. to 6 A.M.

In looking into the results obtained in a general meteorological way, it is found that ozone exists more abundantly in the upper strata of the air than at the surface of the earth, and that it is diminished when the atmospheric conditions favor the rapid loss of electricity.

In the discussion of the subject, Scoutetten finds it necessary to present a short resumé of our knowledge recently acquired on the subject of atmospheric electricity. We shall follow his course closely, as we know no way of giving an adequate idea of this most important contribution to medicine, better than abstracting from, or reproducing the author's ideas.

The *sources* of atmospheric electricity were announced as *two*, by Mons. Pouillet, in 1825, *vegetation* and *evaporation*, to which may be added *chemical action*. In the act of *vegetation*, electricity is so rapidly manifested, that in one of Pouillet's experiments there was disengaged from a surface of 100 square metres, covered with full vegetation, more positive electricity than would have been required to charge a powerful battery. Now, add to the large amount of electricity given off by vegetation over the surface of the globe, that which is furnished by animals, and the amount thus proceeding from the organic kingdom is enormous. *Evaporation* is not as productive in electricity as Pouillet imagined. Indeed, distilled water exposed to the air will not produce electricity in evaporation; but when water separates from some heterogeneous element, with which it has been chemically united, then electricity is produced. This is the case when water evaporates from the earth. Friction of the air over the surface of water, and that of the latter in its movements, are abundant sources of electricity. But chemical action is the most abundant source. Every composition or decomposition illustrates the truth of this statement.

The electrical condition of the atmosphere is subject to continual oscillations. At the rising of the sun it is feeble, but it increases as the sun rises, and as the vapors thicken in the lower strata of the at-

mosphere. This period of accumulation of tension goes on in summer until 6 or 7 A.M.; in spring and autumn, until 8 or 9 A.M.; and in winter, till 10 or 12 A.M. After the *maximum* has been attained at these hours, the electricity begins to decline, at first rapidly and afterwards more slowly; the visible vapors disappear and distant objects seem to approach spectators. Towards 2 P. M. atmospheric electricity is very feeble, scarcely greater than at the rising of the sun. Its diminution is progressive until the *minimum* is reached, in summer at about 4, 5 or 6 o'clock, P.M., in winter at 3 P.M. This *minimum* continues longer than the maximum. As the sun approaches the horizon, the electricity increases again until a *second* maximum is attained at an hour and a half or two hours after the setting of the sun. After this it decreases until morning. All these facts, which Kæmtz has given, agree with direct experiments, which demonstrates, that "*atmospheric air submitted either to a continuous invisible or electric current, or to a succession of sparks, furnishes ozone.*"

Quetelet states that *atmospheric electricity increases in every place, not affected by neighboring bodies; in proportion to its height.*

Whenever storms are experienced, we have also much electrical excitation. These are often accompanied by an odor, somewhat sulphurous in character, affecting the respiration unpleasantly. This is directly due to ozone in the atmosphere. Buchwalder, the Swiss Engineer, who experienced a terrible storm on the summit of the Senlis, when a servant was killed by his side, by lightning, recognized the peculiar odor as the same, with that which greeted his nostrils on entering the laboratory of Schœnbein, while the latter was experimenting with ozone. There can be no doubt as to the production of this substance in the atmosphere when great electrical excitement exists, and its oxodizing power enables us to understand why nitric acid is formed, during such storms, out of the two elements which had been mechanically commingled in the air. That electricity would produce nitric acid by its action on the air, was demonstrated by Cavendish; but here we have the explanation. The statement of Cavendish was the mere narration of a fact, without an attempt at an explanation.

The study of the amount of electricity in the atmosphere becomes a very important subject. Its laws have not yet been determined. By means of continual ozonometric observations, we shall amass such facts as may aid in their determination. Such observations are being made at various points in Europe—at Basle, Berne, Nancy, Versailles, and Amiens, in France; at Constantinople, Athens, Algiers, Italy, and in various parts of Germany and Austria. Several observers in

the United States and Canada are noticing the ozonic condition of the atmosphere. In the course of a few years, the mass of material collected will be exceedingly valuable for the preparation of laws that shall embrace all apparent contradictions of the weather. Already we have learned that "the rôle played by ozone can no longer be undervalued in a host of phenomena where its action had not been suspected, and will most likely increase when we shall better understand its action on telluric miasms and its connection with certain epidemics."

Scoutetten, by a series of experiments performed simultaneously at various heights in the cathedral of Metz, established the law of the increase of ozone in proportion with the height, just as Quetelet asserted was the case with electricity. This proportion, however, does not seem, as yet, to be embraced positively by any special law. The same result was obtained by Decharmes, at Amiens. Ozone does not manifest itself in populous cities, save in exceptional cases, near the ground, although it is found at the top of monuments. On the top of a mountain it is sufficient to elevate the ozonometric slips only 3 or 4 metres from the surface in order to obtain the same effect which from 80 to 100 metres of elevation will produce in a city. Along the side of a mountain the reactions are affected by local influences, and this fact may have intimate relations with the development of cretinism so frequent in the Swiss valleys, which, however, disappear, as Saussure determined, at an elevation of 1,000 metres. Above running or stagnant water, as much ozone may be detected as is in the upper strata of the atmosphere, and sometimes more.

But does ozone obey the same laws as electricity with reference to the diurnal *maxima* and *minima*? The facts thus far reported seem to indicate that the same laws do not preside over the oscillations of the two. Electricity is stronger in the day than at night. But ozone, on the contrary, is more frequently present in large quantities at night, although certain meteorological phenomena may affect this law so that a large quantity will be detected in day. Winds passing from north to southeast, storms, and the fall of snow will produce this effect. Its variations are not regular, nor is their course absolute. These are dependant upon the chemical conditions which favor or oppose its formation.

Ozone does not obey the laws of atmospheric electricity as regards the yearly determinations. Scoutetten carefully examines the conclusions of others who had asserted an exact harmony of laws between the two, and shows that the value of their conclusions was vitiated by a preconceived notion, in accordance with which they read the results of their experiments.

The fact that crowded cities with their animal emanations prevent the formation, is clearly shown in the experiments in Metz. Scoutetten experimented for six months—from October, 1855, to April, 1856, on test paper, furnished from the manufactory of Schœnbein, in the street Tête d'Or, of Metz. This street is narrow, with a sewer at the end. The observations were made 15 metres from the ground, and 25 metres from the sewer. During these six months, the ozonometric paper was only colored four times; first, when there was a west wind and slight rain, on October 2nd; second, on November 7, north wind and fog; third, on December 25, north wind and rain; fourth, December 27, south wind and cloudy sky. During the same time, however, experiments made at the window of his apartments, with southern exposure, above a garden and 10 metres from the ground, almost constantly furnished ozonic reactions more or less strong. The same result attended experiments performed at the hospital, an isolated building, 20 metres from the river. Similar results were obtained by experimenters at Königsberg.

One of the most interesting facts connected with ozone is its rapid development near the ground, when the latter is covered with vegetation. An ozonometric slip suspended in a bell glass covering vegetables in full growth, in less than a hour will show very sensibly the usual reaction. The compost and manure which is employed on the soil may retard or even destroy the action of ozone on the iodureted starch paper. But at times, even when the ammoniacal fumes given off were considerable, the strips were colored rapidly and deeply. This occurred on April 27, 1856, but the next morning the same strips which had been left suspended in the same place had resumed their white color. This singular phenomenon is, however, of easy explanation. In consequence of a storm, ozone may become so abundant that it falls, in some way, from the upper portions of the atmosphere down upon the ground, and then contending advantageously with the miasmatic material, it may color the paper; but as soon as the quantity of ozone diminishes, then the ammoniacal fumes react in turn on the iodide of starch and completely decolorize it.

The facts being ascertained concerning the conditions affecting the presence or absence of ozone in the open air, we are prepared to examine into those with regard to the air in rooms. In each one of the halls of the Military Hospital at Metz, ozonoscopic slips of paper were suspended from 24 to 48 hours, and even longer, without the slightest discoloration; while slips of the same paper suspended outside the windows furnished 7, 8, and even 10 degrees of the ozonome-

tric scale. The surgical ward, situated on the ground floor, with an eastern exposure, containing 800 cubic metres of air, and occupied by only 18 or 20 patients, was next tried. The windows were left open for an hour in the morning and evening, and the temperature was not allowed to exceed 68° F. There was no indication of insalubrity about it—no disagreeable odor. The ozonoscopic paper, however, did not detect an atom of ozone. The same result ensued in employing the test in the fever and venereal wards. The same want of action was shown in Scoutetten's own chamber, which was perfectly ventilated, and even supplied with four windows and three doors.

Dr. Berigny obtained similar results at the hospital of Versailles: the ozonoscopic slips were suspended in the surgical, fever and venereal wards, the windows being left open all the day, and five days' exposure did not result in the slightest trace of ozone. These, and a number of other observations lead to the conclusion that "great centres of population are unfavorable to the formation of ozone."

But all the facts which have thus been obtained, force us to investigate the exact nature of the sources of ozone, or what is the precise character of the bond which unites all the phenomena mentioned in the first portion of this article. It has been shown that ozone is formed by the electrization of oxygen in its escape from water—of that which has been secreted by plants—of that disengaged in chemical actions, and by electric phenomena reacting on the oxygen of the atmospheric air. By a series of ingenious and instructive experiments, Scoutetten has established all these sources of ozone. "From such an assemblage of facts, the proof is obtained, that nature possesses abundant sources of ozone, existing on the surface of the globe as well as in the elevated regions of the atmosphere; and that there is established a perpetual series of ascending and descending currents, exercising a powerful influence upon the production of great electric phenomena, and upon the acts of vegetable and animal life. The discovery of these sources is an event which should throw new light upon the physiology of animals and vegetables; upon the atomic composition of bodies, and demonstrate that a bond of connection, unnoticed before, unites by close cords all substances on the globe."

Physiological Researches.—Having consumed so much space in tracing the history and giving the facts with reference to the constitution and sources of ozone, we must now endeavor to present the value, as at present known, of all this knowledge to physiology and medicine. This portion of Scoutetten's treatise will be most interesting to our readers; and with the view of making it intelligible, we have given the

foregoing abstract. His physiological researches are comprised under three heads—the physiology of vegetables, animals, and that of the terrestrial globe.

Vegetable Physiology.—Most authors are agreed, that plants secrete oxygen during the night and carbonic acid during the day; that carbonic acid absorbed by the leaves is decomposed under vital action, the oxygen being exhaled and the carbon retained as a portion of the vegetable, and that nitrogenous matters form the active part of manures. Scoutetten's investigations into the composition and action of ozone, induced some doubts as to the justness of these conclusions. He arrives at the conclusion that vegetable physiology must be reconstructed, as it is no longer possible to admit that the carbonic acid which leaves or roots absorb is decomposed under the influence of vital action, or that *its* oxygen is exhaled and *its* carbon fixed. We are not prepared to endorse this conclusion, as the number of experiments is too small upon which it is based, although these seem to have been very fairly and carefully conducted. He thinks that he has demonstrated that plants cannot furnish ozone unless they derive oxygen from the water which holds it in solution, or from the atmospheric air; and says that when they cease to be in such a condition, all secretion of ozone ceases, which proves that when electrized oxygen is disengaged it cannot proceed from the decomposition of carbonic acid or water. This conclusion evidently arises from the adoption of an unproved premise. The major proposition, in his syllogism, lacks proof. The whole syllogism would run thus: Oxygen is *only* given off from plants in the form of ozone; no ozone is produced when plants are placed in distilled water, or in a vacuum; *therefore* no oxygen is given off. The major is certainly not yet so satisfactorily ascertained that it can be assumed as true, and hence the conclusion is not reliable.

With reference to the statement that all physiologists consider nitrogen as the active portion of manures, we think Liebig and his disciples must be considered as having already brought serious objections to such a conclusion. Liebig says,* "that ammoniacal salts *alone*, have no effect; that, in order to be efficacious, they must be accompanied by the mineral constituents, and that the effect is then proportioned to the supply—not of ammonia, but of the mineral substances." Scoutetten shows that it is surprising how small a quantity of nitrogen is furnished by manures as compared with the importance of its rôle in nature. Boussingault, in his analysis of the dung of the

* Principles of Ag. Chemistry with reference to late researches made in England, 42.

farm-yard, found in that which was dried at 230° F., only 2 per cent. of nitrogen; and in the same combined with the ordinary amount of moisture, but 0.41 per cent. Horse-dung contains 2.7 per cent. when dry; that of the cow, 2.6; and that of the hog, 3.4 per cent. of nitrogen; while these contain respectively, 38.6, 39.8, and 48.4 per cent. of carbon. The assertion that nitrogen acts as a ferment, and that its action on plants may be very different from its action on animals, is hypothetic. But what is the value of the large percentage of carbon? *It* must have an important rôle to play. Carbon in *the animal* is burned to produce heat, as Liebig and Dumas have long since shown. But heat is produced by the vitality of plants, as has been demonstrated by Van Beck and Dutrochet, with the aid of Becquerel's delicate thermo-electric needles—and this is considerable at the time of fecundation, sometimes greater than that of animals with active circulation of the blood. "An elevation of 9° C. has been detected in the spadix of Arum italicum, and in the spadix of Colocasia odorata the enormous temperature of 129° F. has been noticed, September 5, 1838, when the surrounding atmosphere was only 79° F. Is not this elevation of temperature to be explained" by a species of combustion? Is not calorification in plants, or in animals, an act of vital chemistry? Is not the period of fecundation in plants similar to that of rutting in the animal when a febrile excitation, as it were, in the organs of generation augments the natural heat considerably?

The amount of moisture transpired by vegetables is very great, is indispensable for the formation of ozone out of the oxygen of the water contained in the plant. The evaporization of this water removes some of the deeper abundant caloric, thus preserves the plant, even under great extremes of solar heat, at its normal temperature, which is *generally* below that of the surrounding atmosphere. Is this reduction of temperature as a general thing the result of the decomposition of carbonic acid or of water?

Scoutetten's theory on this subject is as follows: the water exhaled from the leaves is principally obtained from the ground, and contains a large quantity of air with a larger proportion of oxygen than atmospheric air. The absorption of this water by the roots, creates a vacuum, owing to which gases and liquids are attracted towards the radicles from the earth and afterwards absorbed, introducing thus various saline substances into the plant. Ozone, secreted by the leaves, is retaken by them and the roots through absorption—thence it enters into the vessels, and finding there mingled in the sap nutrient substances rich in carbon, it burns the latter, developing heat and form-

ing carbonic acid which is expelled during the night. Thus inspiration and expiration are the same with the vegetable as the animal. The carbonic acid given off at night, falls from its natural sp. gr., to the earth, penetrates the soil, is dissolved in the water, and enters the vessels of the vegetable; here, under vital influence, it abandons its oxygen, and deposits the carbon for the development of the body of the plant. "Let there be added to these acts, the introduction of some salt, the assimilation of a part of the absorbed water, the decomposition of another portion, which furnishes the hydrogen so indispensable to the vegetable, in quantity larger than that which is necessary for the formation of water, and finally the excretions whose quantity varies with the temperature and seasons, and thus we account for the elements that analytical chemistry detects in vegetable composition." Plants thus make the very atmosphere, and the carbonic acid which they require for their own nutrition. All this may be compared to the digestive process in the ruminantia. The alimentary material is introduced in the first stomach, submitted to a process, which renders it assimilable, then it leaves the paunch, ascends to the mouth, undergoes a second trituration, descends to the second stomach, where it is digested and the reparative juices are removed.

Should this theory be true, then, plants exhale by day, not oxygen, but ozone, which is furnished from the water they possess, and not through the decomposition of carbonic acid. Nitrogen plays a second part as a manure, and carbon takes a first rank. Water charged with carbonic acid hence becomes a most useful agent in the growth of plants. The most favorable circumstances for the growth of vegetables are those which will furnish ozone as the stimulant, and carbonic acid as the nutriment.

Animal Physiology.—What is the reason that country air is more salubrious than that which is contained in cities? Can we account for it on the supposition that plants secrete more oxygen, and furnish the same in large quantities? But analysis has shown that the proportion of oxygen is not greater in the one case than the other; and it has been proven that the mere addition of oxygen will not destroy the odor of putrefying bodies. Indeed, meat will putrefy more rapidly in *pure* oxygen than in the open air. It is the ozone in the country which acts as the purifier of the air, as the following experiments must necessarily establish. Meat that was in a putrescent state, being plunged in a flask containing ozone, was quickly disinfected; horse-dung, which gave off a powerful ammoniacal odor, when plunged into ozone lost this odor; water from a maceration tub, in the amphi-

theatre of the Military Hospital, at Metz, was agitated in a flask with ozone, and made inodorous; two piles of horse-dung were placed in one of the empty wards which had the capacity of 1,100 cubic metres, and were allowed to remain for several days, until the room was thoroughly infected with the ammoniacal odor; they were then removed, and the ozone contained in 4 bottles, each containing from 6 to 8 litres, was admitted into the room, when the odor instantly disappeared. Ozone is thus shown to be a great purifier of the air from miasmatic materials, and it renders the surface of the earth habitable, although there is incessant decomposition of organic material. But as ozone is an energetic excitant of the animal system, its accumulation would be very detrimental. This is prevented by the law "*that* oxidizable miasmatic material is destroyed by ozone, while in their turn they destroy it."

Ozone, when present in the air in large quantity, say one two-thousandths, rapidly produces hyper-excitation of the respiratory organs, resulting in great trouble in the lungs, and throughout the whole organism; when the proportion is less, a spasmodic state of the bronchia and thoracic muscles are produced, and later, its action being continuous, coryza, intense bronchitis and pneumonia. That, in small dose, it is a healthy stimulant, the effect of country and town air incontestibly shows. When the equilibrium is destroyed which exists between it and the miasmatic material that decomposing vegetables produce, as is the case during winter, when the air is pure and the earth frozen, then it becomes a cause of danger and disease.

Physiology of the Terrestrial Globe.—Under this head the author considers the subject of meteorology, which, he admits, up to this time has consisted more of facts than laws, although he thinks the discovery of ozone has paved the way for the formation of the latter. It would be interesting to follow him in his explanation of storms, and other meteorological phenomena, but we are admonished, by the limited space at our command, that we must hasten to the last and most important portion of this valuable treatise.

Medical Researches.—If ozone is such a powerful actor, as has been mentioned, on the animal and vegetable organisms, it must, in some way, be connected, either by presence or absence, with the formation of disease. Are diseases ever accompanied by a diminution or absence of ozone? When Schœnbein announced the peculiar destructive action of ozone on miasmatic materials, it was at once supposed that the absence of this article from the atmosphere constituted the main cause for the virulence of cholera, and its presence was claimed as the prop-

er antidote. Hunt, of England, announced that he had found the air devoid of ozone during an epidemic visitation of cholera. The Medical Society of Koenigsberg appointed a Commissioner to make ozonometric observations for 12 months in that city and in its environs, and to prepare a tabular statement of these, along with one of the acute diseases prevalent contemporaneous with these observations. Their observations commenced with June 1st, 1852, and ended May 31st, 1853, during which time 6,251 cases of acute disease were recorded. The annexed table contains the results of this Commission. Our readers will be able from it to judge of the correctness or incorrectness of the deductions made from it.

Table indicating the manifestations of atmospheric Ozone and the prevailing diseases.

	June.	*July.*	*August.*	*Sept.*	*October.*	*Nov.*	*Dec.*	*Jan.*	*Feb.*	*March.*	*April.*	*May.*
Maximum of Ozone	10.1	8.0	10.5	13.1	14.1	14.5	15.6	12.9	14.9	18.3	14.5	11.9
Minimum of Ozone	1.6	2.0	2.3	2.1	2.3	0.1	2.0	3.1	7.6	7.2	6.3	3.8
Mean	5.5	4.8	5.2	7.1	8.2	7.5	9.2	8.8	10.9	11.2	10.8	8.1
Number of Cases observed	408	358	591	993	752	797	603	465	451	310	340	183
Percentage of different diseases.....												
Diseases of Chest and Throat	34.8	27.3	9.9	10.3	19.2	27.9	28.5	37.8	37.0	25.1	24.1	24.5
Measles	0.2	1.6	4.0	7.0	18.3	33.8	16.7	4.0	0.4	0.3	0.5	1.0
Typhus and Gastric Fever	13.2	20.9	30.1	13.9	9.3	7.2	10.9	9.8	9.0	13.8	8.8	8.7
Intermittent Fever	26.4	16.2	25.5	16.5	9.9	7.2	7.2	8.8	15.5	30.6	36.4	44.2
Diarrhœa	10.2	17.8	17.7	22.2	14.7	9.0	9.4	7.7	6.6	5.1	4.7	4.3
Cholera	....	....	0.3	20.7	15.8	2.3	.....	.....	.....	.....	.....	.....
Other diseases	14.8	15.7	12.0	9.1	12.3	12.3	26.8	31.7	30.5	24.5	25.3	16.7

The Koenigsberg physicians concluded from these results that there was no positive relation between any particular disease and the ozonic condition of the atmosphere. In 1854, the Vienna physicians came to the same conclusions as their brethren of Koenigsberg. On the other hand, however, Boeckel, of Strasburg, showed that there was an intimate relation between the development of cholera in 1854–55, in that city, and the diminution or disappearance of ozone. In July of the former year, the cholera was very fatal, but little ozone was detectable in the atmosphere. On the 17th, when there was total deficiency of this substance, the disease was especially violent. This deficiency was not only in the air of the city, but in that of the adjoining country. During August, the cholera was particularly violent, and the ozonometric indicator was zero. On the 15th of September, indications of ozone began to make their appearance, and the cholera sensibly diminished. When the former became very marked, then coryza, bronchitis, and pneumonia became common. In the month of

June, 1855, during the first four days, three nights were, according to the ozonometer, zero, and the cases of cholera which he saw, broke out between midnight and 6 A. M. Boeckel concludes that "the want of ozone constituted the predisposing cause, while the contagious miasma produced the disease, which was then further propagated." Drs. Robert and Conraux, of Newdorf, near Strasburg, have also noticed this same apparent relation between a want of ozone in the atmosphere and the raging of cholera. Simonin, Senr., noticed such a relation at Nancy, in 1854, but not in 1855. Wolf, the Director of the Observatory at Berne, from an examination of the official list of deaths at Aarau, concludes that cholera is, at least, externally *favored* by the diminution of ozone.

How shall we account for these differences? Scoutetten thinks the question is, to a certain extent, *sub lite*, but that the differences may be accounted for by the imperfect mode in which the ozonometer was employed; the experiments were not performed in accordance with a definite plan, and the peculiar conditions necessary for exact ozonometric determinations were not then as well understood as now. It is necessary that experiments should be made *de novo*. These should be performed at least 30 metres (about 33 feet) above the ground, so as to be out of the range of local sources, favoring either the formation of gases that are destructive to ozone, or its own formation.

Are there any diseases which arise from an excess of ozone? The physicians of Basle agree with Schœnbein, that there is a direct relation between the production of catarrhal affections and a super-abundance of ozone. Each exacerbation of affections of the organs of the chest correspond with an increase of ozone. Dr. Spengler noticed the same result during an epidemic of Grippe, at Roggendorf, Mechlenburg. Clemens, of Frankfort, who has charge of the workmen at a Napthaline factory, where no ozone has ever been detected, has only had four cases during three years of catarrhal affection to treat among 30 workmen, notwithstanding their constant exposure to circumstances which are calculated to generate such affections. His conclusions coincide with those of Scoutetten.

Taking all things into consideration, we must conclude that the ozonic portion of the Koenigsberg tables are unreliable. They contradict results obtained by careful observers, thoroughly informed on the subject. If Scoutetten's views are correct, then ozone plays a very important rôle in our climate.

Can ozone be employed as a therapeutic agent? As it is an active stimulant to vitality in animals and plants, may it not be useful in all

cases where the normal combustion resulting from the inspired air is incompletely affected, as in chlorosis, scrofula, and anemic diseases generally? We are not prepared to give a negative to these questions. As yet, we have no means of graduating the amount of ozone which we could throw into the air of rooms occupied by patients laboring under those diseases; hence, it would be an uncertain agent. A surplusage would produce injury. The time may come when this agent will prove a most efficient article for administration by inhalation. For the present, Scoutetten proposes that solutions of ozone in water be employed as a therapeutic agent. This oxygenated water, which must not be confounded with the poisonous binoxide of hydrogen of Thenard, can be prepared by bringing perfectly pure water in contact with compressed oxygen gas. In this way, as much as 6.5 per cent. of oxygen may be dissolved by water. Such water has an agreeable taste, is less effervescent than carbonic acid water, but preserves its gas better. When taken into the system, it is an efficacious means of exciting vitality with lymphatic and chlorotic persons, and withal, those who experience the destructive effects of incomplete hematosis. It facilitates the functions of the stomach, and seems to favor the secretion of urine.

Schœnbein has introduced ozone associated with ol. terebinthinæ into therapeutic use. The latter oil will absorb a large quantity of oxygen, producing a substance of great oxidizing power. By exposing bottles of white glass half filled with ol. terebinthinæ to the action of sunlight, an oil charged with oxygen is obtained, which resembles ol. menthæ pip. in odor and taste; and, when placed on the tongue, produces a piquant taste, followed by a sensation of coolness.

This ozonized oil of turpentine has been found particularly useful in chronic catarrh of the urinary passages, in incontinency of the urine, in hematuria, in chronic sciatica, gout and rheumatism.

From this abstract of Scoutetten's book—the first complete collection, in a scientific shape, of all that is known on a subject both new and interesting—the reader can perceive that, although much may be hypothetic and as yet unsupported by facts, and more may prove fallacious, still the amount of valuable information contained in it is very great. With new experiments and more careful observations, we may be able to obtain results that shall justify his expectation as to the necessity of reconstructing our received systems of vegetable physiology. Organic chemistry is, at best, but a collection of facts which have been accumulated from all quarters, and on which theories illim-

itable have been constructed. The greater the amount of facts aggregated, the greater the facility for forming a correct and stable theory. We are confident that such a theory will be simple and intelligible to the youthful student as well as to the veteran chemist. L. H. S.

The Transactions of the American Medical Association. Vol. X. Philadelphia: 1857.

We had partially prepared a careful review of some of the papers contained in this volume, for the December number of the MONTHLY. The closing labors of the year, and the large amount of matter which demanded a place in our pages, prevented us from noticing it at that time; and we are still embarrassed by the same wealth of material, so that we shall have to forego the insertion of any lengthened notice.

The volume is smaller than several of its predecessors, but the papers which comprise it will favorably compare with those which have heretofore been yearly placed upon our table. That portion of it devoted to the proceedings of the Association, commences with the address of the President, *Dr. Z. Pitcher, of Detroit.* In this address a glance is taken "of the condition of the profession at the time this organization sprung out of the antecedent chaos; the cause or causes of that condition; whether inherent or incurable, or whether arising from intrinsic circumstances which may be remedied; and whether this remedy is to be found in public authority, or sought for in associated professional influence."

This is followed by a "*Report on the Medical Topography and Epidemics of Maryland,*" *by Drs. P. Wroth, A. M. White, and E. G. Waters.* One of the reporters, in discussing the prevalence of Scarlet Fever, remarks, on the use of belladonna as a prophylactic, that "he is inclined to the belief that it is not entitled to its reputation as a preventive of this disease." Of the medical treatment of scarlet fever he has nothing new to offer; but he makes an important remark, showing the tendency, in all sections of the country, to that conservative form of treatment, the expectant mode; for, in "its mildest forms," he says, "good nursing is better than medicine." So, too, in the treatment of measles, he remarks, that "non-interference is the best policy, as the disease always has a tendency towards recovery."

We must omit some extended remarks we had prepared on the next paper, entitled a "*Report on Infant Mortality in Large Cities, the sour-*

ces of its increase, and measures for its diminution," by D. Meredith Reese, M.D., LL.D., &c. Doubtless, the mortality among infants is alarmingly large, and requires energetic and speedy action towards the adoption of such measures as will check the causes which tend to swell these weekly bills of mortality in our large cities. We believe, however, that the means suggested in this paper are, for the most part, utopian; for how are we, for instance, to enforce celibacy by statute upon "all consumptive, scrofulous, scorbutic, gouty, insane, intemperate, and especially syphilitic individuals, of either sex?" Would it not require more than autocratic power to establish such a law, and more than human ken to discern all the subtle influences, "hereditary or transmissible, which affect the offspring, or are fatal to infantile life?"

Still this paper deserves especial attention, and we hope that some of the suggestions of the author will meet with such action upon the part of the profession that the majesty of the law will come to its aid, to bring about such sanitary and moral changes that the statistics of infant mortality will not present so lamentable a show.

Following this is a *Report by Alexander J. Semmes, "On the Medico-Legal Duties of Coroners."* The view it takes of the position of medical men towards the State as experts, is the only one that can be taken with honor to the profession. They should be recompensed amply for their services and information, gained, as it is, by much toil, and frequently no little danger, and this paper should be commended for the proper view it takes of this matter.

The next paper is a *"Report upon the Topography and Epidemic Diseases of the State of Georgia," by John F. Posey, M.D., of Savannah;* which is followed by a *"Report on the use of Cinchonia in Malarious Diseases," by F. Hinkle, M.D.;* by a *"Report on the Blending and Conversion of Types in Fever," by C.G. Pease, M.D., of Janesville, Wisconsin.* We should like to speak particularly of this paper, which is more suggestive than argumentative. Our intention, however, is merely to indicate the titles of the different papers in this volume, and we can therefore only refer our readers, who are interested in this subject, to a careful reading of the facts brought forward in this paper.

Next is a *"Report on a New Principle of Diagnosis in Dislocations of the Shoulder Joint," by L. A. Dugas, M.D;* a *"Report on the Fauna and Medical Topography of Washington Territory," by George Suckley, M.D., U.S.A.;* a *"Report on the Medical Flora of Washington Territory," by J.G. Cooper, M.D.;* a *"Report on Deformities after Fractures," by Frank H. Hamilton, M.D.;* and a *"Report on the Nervous System in Febrile Diseases," by Henry F. Campbell, M.D., of Georgia.*

The two Prize Essays, which complete the volume, will be spoken of more at length at another time. The first in order, "*The Excito-Secretory System of Nerves, its Relations to Physiology and Pathology,*" *by Henry F. Campbell, M.D.*, has recently appeared, with other essays by the same author, in a separate volume, a notice of which is being prepared for our pages.

The other Prize Essay has for its title "*Experimental Researches relative to the Nutritive Value and Physiological Effects of Albumen, Starch, and Gum, when singly and exclusively used as Food,*" *by William A. Hammond, M.D., U.S.A.*

Materia Medica, or Pharmacology and Therapeutics. By WILLIAM TULLY, M.D., formerly President and Professor of Theory and Practice in the Vermont Academy of Medicine, and Professor of Materia Medica and Therapeutics in Yale College. Edited by JEFFERSON CHURCH, M.D. Springfield, Mass., 2 vols. octavo, 750 pages each.

This new and highly important work should so extensively interest the profession, as to create for it a general and special demand.

The extensively scientific research, originalities, analytical acumen, demonstrating the diversified properties and powers of each medicinal agent, the new principles evolved for their administration as specific means to a specific end in the treatment of disease, the originality in the classification, the use of *interestingly significant* and *appropriate terms* for many of the unmeaning and stereotyped terms so long in vogue, all characterize this work as peculiarly unique, eminently scientific, independent and progressive, and as one of the most important that has ever honored America, or even Europe, within the present age.

It is a work destined to essentially and desiredly modify, if not to revolutionize, the views and practice of the profession. We feel assured that medical bigotry, prejudice and ignorance will suffer in the same ratio as the profession avails itself of these interesting volumes and gives them a critical reading.

This great work has been published at an embarrassing pecuniary loss, by a devoted lover of a scientific profession, whose acquaintance with the medical and literary excellences and experience of Dr. Tully, has induced him for the benefit of the profession to make the sacrifice.

It is what should be reasonably expected from a liberal profession, that a sufficiently liberal patronage shall be extended to it, to secure for it generally a dispassionate and thorough perusal, in which case

we feel confident that it will be regarded as a rich treasure for reference, if it should not be endorsed entirely.

Dr. E. D. Hudson, at 378 Broadway, N. Y., will receive subscriptions, and deliver the work at his office. *

Braithwaite's Retrospect of Practical Medicine and Surgery. Part XXXVI., American Edition. New York: Stringer & Townsend. 1858.

We are not surprised that this half-yearly Journal of the medical sciences is so general a favorite. Its pages are so full of the prominent discoveries and improvements in medicine and surgery, and it has become so essential to every physician, that the simple announcement of its appearance from the press is sufficient. The present number abounds in abstracts from practical articles, and is enriched by a General Index of the last four parts, including the present one. A complete index to the whole series, up to the 34th Part, has recently been issued in a separate volume, making it still more valuable as a work of reference.

Half-Yearly Abstract of the Medical Sciences. By W. H. Ranking, M.D., and C. B. Radcliffe, M.D. No. 26, July to December, 1857. Philadelphia: Lindsay & Blakiston. 1858.

The great feature in this half-yearly journal, in addition to the numerous abstracts of papers found in American as well as European Journals, is the several reports appended to it. In these reports, under the distinctive heads of Medicine, Surgery and Physiology, lengthy papers and books are analyzed, and the profession by this means is kept well informed upon everything of real value that issues from the press.

SELECTIONS.

Remarks upon the Treatment of Acute Internal Inflammations. By R. B. Todd, M.D., F.R.S., Physician to King's College Hospital.

[An Extract from a Clinical Lecture delivered in July, 1857.]

The case of Jane Cook, aged twenty-two, affords a good illustration of the phenomena of disease in its most acute form. She has had pericarditis in connection with rheumatic fever, some degree of endocarditis, and pneumonia with consolidation of about a fourth of the posterior part of each lung.

This patient is rapidly recovering, and, indeed, in an illness of unusual severity, she has had no serious drawback. On the 2nd of July rheumatic symptoms first showed themselves in pains and swelling of the lower joints. On the 6th of July a pericardial friction sound was first heard over the base of the heart, which soon became distinctly audible over its whole anterior surface. On the 7th bronchial breathing was heard at the posterior part of the lower third of the left lung, and on the 10th the right lung was similarly affected and to an equal extent. On the 12th vesicular breathing began to be audible in both lungs, and the bronchial breathing to disappear.

Now this patient was treated in the manner in which (with but slight modification) I have been for some years in the habit of dealing with similar internal inflammations, especially those of the lungs and heart. Although my practice in such cases is now pretty well known, and I am proud to think is practised by very many of my pupils in various parts of this city and of the country, it may be useful if I take this opportunity of explaining to you the principles upon which it is based.

On admission, while yet it was uncertain how far the rheumatic symptoms would extend, she was treated with alkalies and mild saline purgatives. Bicarbonate of potass in doses of from twenty to thirty grains were given every four or six hours, and very soon opium was freely given, when the cardiac affection manifested itself. As much as one grain of opium was given every fourth hour. Care was taken to keep the bowels open by giving an aperient draught daily of sulphate and carbonate of magnesia. Counter irritation was employed over the situation of the inflamed lungs by means of stupes of flannel soaked in turpentine; these were applied twice or thrice a day, and the region of the heart was freely blistered.

A principal and very important part of the treatment to which, as most of you know, I pay very special attention is that which I may call the dietetic portion. The object of this is to support the vital powers of the patient and to promote general nutrition, during the time when those changes are taking place in the frame which tend to check or to alter the morbid process, and to convert it into a healing process.

When a patient suffers from pneumonia, the tendency is for the lung to become solid, then for pus to be generated, and at last for the pus-infiltrated lung-structure to be broken down and dissolved. Such are the changes when matters take an unfavorable course. On the other hand, recovery takes place, either through the non-completion of the solidifying process, or by the rapid removal, either through absorption, or a process of solution and discharge of the new material, which had made the lung solid.

It will scarcely be affirmed, even by the most ardent believer in the powers of the Therapeutic art, that any of the measures which are ordinarily within our reach, such as the administration of certain drugs, or the abstraction of blood, or the application of blisters, exercise a *direct* influence in effecting these changes. Save in the case of antidotes, which directly antagonize the proximate cause of the

morbid state, medicines promote the cure of acute disease by assisting and quickening some natural curative process. And he is the wisest practitioner, and will be the most successful therapeutist, who watches carefully the natural processes of cure—in other words, who studies the phenomena, both anatomical and physiological, which accompany them, and of which, indeed, they consist.

Let me, therefore, exhort you to look very carefully to this as a part of your clinical study. If you will be on the look-out, you may often meet with cases of acute disease which recover with little or no medical treatment, and you may observe and note the clinical phenomena which they exhibit.

Allow me to anticipate your observation on this point, and to point out what you may look for in cases of pneumonia, and what you will certainly find in almost every instance.

First, the hot, often burning skin, which is so generally present in the first stages of pneumonia, will be exchanged for one bedewed with moisture, generally to the extent of free sweating.

Secondly, along with this sweating process there will be one of increased flow of urine, and very often a free precipitate of brick-dust sediment, lithate of soda, more or less deeply colored.

Thirdly, not unfrequently expectoration becomes freer, the sputa are more easily discharged, they lose their characteristic reddish, rusty color, and often they become very profuse and even purulent. Now and then the purulent sputa are so abundant that it is difficult to imagine that they can have come from any other source than an abscess.

Fourthly, the chemical characters of the pneumonic sputa exhibit an interesting contrast with those of the urine. In the height of the inflammatory state, the sputa contain common salt (chloride of sodium) in abundance, and the urine is entirely devoid of it. As the inflammation becomes resolved the salt returns to the urine and leaves the sputa.

Lastly, while all these changes are going on, the physiological functions which have been disturbed by the local malady, gradually approach their normal state. The quickened breathing, the accelerated pulse, the unnatural general generation of heat gradually subside. As all these admit of being measured by numbers, you should tabulate them in your records of cases, and you will find on each succeeding day (under such circumstances as I am now referring to) the figure assignable to each function gradually become lower until you arrive at the normal.

Now is it not plain from all this that the process of resolution of pneumonia is a distinct natural process, affected by the various physical agencies which are concerned in the nutrition of the lung? A material which clogs the air cells and minute tubes is removed, chemical changes of the most marked and obvious kind accompany the deposition and the removal of this material, and certain functions of excretion become strikingly augmented, as if for the purpose of getting rid of some noxious matter out of the circulation. A more exact and minute analytic chemistry than we have at present will, at some

future time, beyond doubt, detect more minute changes in the blood, and determine the exact nature of the discharged matters.

One other remark I must make in connection with this subject. These acute internal inflammations are very often—I suspect always—connected with the undue prominence of some peculiar diathesis—the gouty or the rheumatic, for instance—sometimes the scrofulous. Of these diatheses the main characteristic is the generation of some peculiar morbid matter which, when accumulated in undue quantity in this or that organ, gives rise to inflammation in it. And the determination of the morbid matter to the lung, or the pleura, to a joint or a muscle, will often depend on the direct influence of cold, or of an unwonted amount of exercise, or of some mechanical injury. The evil is to be remedied by the diminution of the intensity of the diathesis. This is done naturally, and is to be imitated artificially, by the elimination of the morbid element through the channels of augmented excretions, such as the sweat, the urine, and the secretions of the alimentary canal.

You will perceive, then, that my argument may be thus summed up. Internal inflammations are cured, not by the ingesta administered, nor by the egesta promoted by the drugs of the physician, but by a natural process as distinct and definite as that process itself of abnormal nutrition to which we give the name of inflammation. What we may do by our interference may either aid, promote, and even accelerate this natural tendency to get well; or it may very seriously impair and retard, and even altogether stop, that salutary process.

If, then, this view of the nature of the means by which inflammation is resolved in internal organs be correct, it is not unreasonable to assume that a very depressed state of vital power is unfavorable to the healing process. Indeed, if you watch those cases in which nothing at all has been done, or in which nothing has been done to lower the vital powers, you will find that the mere inflammatory process itself, especially in an organ so important as the lung, depresses the strength of the patient each day more and more.—*Archives of Medicine.*

Hæmorrhage in Early Pregnancy Practically Considered. By J. HENRY BENNET, M.D., Physician-Accoucheur to the Royal Free Hospital.

Hæmorrhage during the early stages of pregnancy is generally, if not always, a source of anxiety and doubt both to the patient and to the medical attendant. Of anxiety, because it is the constant forerunner of abortion; of doubt, because its repeated appearance, simulating irregular menstruation, often throws a doubt on the reality of the pregnancy.

Hæmorrhage occurring under these circumstances is still too exclusively considered by accoucheurs in connection with diseased condition of the ovum and of its membranes. The important fact, that it is frequently the result of chronic inflammatory conditions of the body

and neck of the uterus and of the cervical canal—a fact to which I drew attention many years ago—is still generally ignored and overlooked; and yet the additional experience I have since acquired has completely confirmed the truth of the views I then brought forward.

Hæmorrhage may occur during early pregnancy, owing to the partial separation of the ovum from its uterine connections; owing to the existence of a blighted ovum or mole; or owing to the above-mentioned inflammatory conditions

When the connection between the ovum and the uterus is modified, under the influence of the maternal, fœtal, or accidental causes, which are generally recognized as the causes of abortion, hæmorrhage is the usual result. In a case of this kind, if the cervix uteri is brought into view, it is found quite healthy, merely presenting the size and color that pertain to the stage of pregnancy which the patient has reached. The blood is seen gently oozing from the orifice of the cervical canal. These are the cases in which rest and constitutional treatment alone are required, and often succeed, especially when the hæmorrhage has followed some accidental cause. As long as the fœtus is alive, there is reason to hope that any mischief that may have occurred may be repaired, the hæmorrhage arrested, and the pregnancy saved. Moreever, as we cannot tell positively, at first, whether the fœtus has died or not, it is our duty to continue our efforts to preserve it, until the violence of the hæmorrhage has destroyed all hope, or until the abortion has actually taken place.

The hæmorrhage which is occasioned by the conditions that lead to abortion is, generally speaking, either subdued, or it continues, notwithstanding treatment, until the abortion has occurred. It may be arrested, and then break out again and again, but this is the exception. When uterine hæmorrhage occurs irregularly in the early months of pregnancy, the cervix uteri being free from inflammatory lesions, stopping and returning repeatedly, without uterine contractions, it is generally occasioned by the presence in the uterus of a blighted ovum or mole; and, in some rare instances, by that of hydatids.

The fœtal germ may die soon after conception, and become atrophied, absorbed, or lost, whilst the membranes and placenta may continue to grow, like moss on a wall, deriving nourishment from the inner surface of the uterus, and forming an indistinct fleshy vascular mass. It is to intra-uterine masses of this description, the true origin of which was long unknown, that the term mole has been given. Their presence in the uterus, and progressive development, sometimes for many months, gives rise to many, if not most, of the symptoms of pregnancy, and is attended, all but invariably, with repeated irregular hæmorrhage. Sometimes the hæmorrhage is constant; sometimes it is irregularly periodical, simulating morbid menstruation. When these symptoms are present, the state of the patient is necessarily one of doubt and uncertainty, until the mole is expelled. The morbid product to which the name of hydatids of the uterus has been given, is probably generated under the same circumstances, and its presence is attended with identically the same symptoms, viz., irregular, constantly recurring

hæmorrhage, and the more or less perfect reproduction of the ordinary signs of pregnancy.

The above are the generally recognized causes and forms of hæmorrhage during the early stage of pregnancy, and with them we may group chronic inflammation of the body of the uterus. The cause to which I wish specially to draw attention, viz., inflammatory lesions of the cervix uteri, although overlooked as yet by most accoucheurs, is most certainly the one which is by far the most frequently met with in practice, and the one also over which we have the greatest therapeutical control.

Inflammation and ulceration of the mucous membrane covering the cervix uteri, and lining the cervical canal, is now generally admitted to be a lesion of frequent occurrence in child-bearing women. Such being the case, and the presence of these morbid conditions, although a cause of sterility in some, not preventing pregnancy in many, the two conditions, pregnancy and inflammatory ulceration, must and do often exist. Whenever their co-existence takes place, occasional hæmorrhage, slight or severe, may be said to generally occur, and the more readily as all ulcerative lesions of the uterine neck assume in pregnancy a very irritable fungoid character. Thus hæmorrhage may occur spontaneously, or it may depend on accidental causes, such as over-exertion, marital intercourse, &c. It may be irregular or it may be periodical, simulating menstruation. In any case, its existence is not so much, in most instances, a danger as a relief to the congested and inflamed uterus. The real danger is the existence of the inflammatory disease of the uterine cervix, which causes the hæmorrhage, and unfits the uterus for the functions which it is performing. The pressing therapeutical indication is to subdue the uterine disease, to heal the ulcerated surfaces from which the blood so readily oozes, and thus to put an end to the danger which threatens the life of the fœtus.

It will be perceived that valuable rules may be deduced from what precedes, for our guidance in practice. If a healthy pregnant female is suddenly attacked with hæmorrhage in the early stages of her pregnancy, we are warranted in considering the hæmorrhage the forerunner of abortion, and we must treat it accordingly. The patient must be kept in the recumbent position, mineral acids and sedatives should be given internally, and laudanum injected per anum if there are uterine tormina or contractions presents. Of course no examination should be made, as it might prove an additional source of irritation. If, however, the treatment resorted to, at first successful, subsequently fails, the hæmorrhage again appearing; or if even on the first attack there are decided antecedents of uterine suffering in the history of the patient, a careful instrumental examination of the uterus and of its cervix should be made as soon as possible. If no inflammatory lesions are discovered, we may prepare for the doubts and uncertainties connected with blighted ova; but if, on the contrary, inflammatory lesions are recognized, they should be at once treated and removed. In the latter case, we may hope that the hæmorrhage merely proceeds

from the inflamed or ulcerated mucous surface, and that the integrity of the ovum and of its attachments to the uterus has not suffered. Generally speaking, in such cases, if the hæmorrhage has not been allowed to continue too long, the pregnancy is saved by the cure of the local disease. I may safely say that I have saved very many pregnancies by applying the above rules of practice, and that many children now alive and well owe their lives to the recognition of these important facts.

In some instances, where the cervix is diseased, inflamed, and ulcerated, and the blood is seen, on examination, to ooze from the ulcerative surface, the fœtus is dead, and the ovum partly detached, when the examination is made; or these accidents occur before the practitioner has had time to modify the cervical inflammation. In such cases, the treatment of the latter disease does not, of course, save the pregnancy. As, therefore, we never can be sure that the fœtus is still sound and alive, or will continue so, it is well to inform the patient and her friends, from the first, that all our efforts may be unavailing to save the existing pregnancy. Were this precaution not adopted, they might attribute the abortion to the very means used to prevent it.

It is worthy of remark, that cases of this description, in which chronic inflammatory thickening and hypertrophy of the cervix complicate the abortion, are those in which the hæmorrhage is the most severe, the most continuous, and the most intractable. The reason is very simple. The os uteri, thickened and hardened by disease, cannot open to allow the ovum to pass, so the latter is arrested *in transitu*, and the hæmorrhage continues, mechanically as it were, for days. I have repeatedly been sent for to cases of this kind, in which the patient, anæmic from loss of blood, was apparently at the last gasp, have found a morbid, rigid os, half open, and have been able with the speculum forceps to extract an ovum thus retained, thereby at once arresting the hæmorrhage. As pregnancy advances, the cervix, even when thus diseased, generally softens and yields.

Lastly, I may here repeat what I have elsewhere stated, that whenever I have been able to examine the uterus of a really pregnant woman, supposed to be menstruating during pregnancy, I have all but invariably found that there was more or less extensive inflammatory ulceration of the uterine neck. The so-called menstrual discharge was clearly, in these cases, merely an hæmorrhagic flux from the denuded cervical mucous membrane. It may, however, have occurred under the influence of the ovarian or menstrual molimen, which is no doubt still felt to a considerable extent by some females, during the early months of pregnancy.

This clinical fact offers another element of diagnosis in cases of controverted pregnancy. If a female who presumes herself, or is presumed by others, to be pregnant, notwithstanding the presence of a menstrual flux, is found on examination to be free from inflammatory and ulcerative lesions of the uterine neck, the presumption is that she is not pregnant. If she has such disease, it may be the source of the flux, and the presence of the hæmorrhage does not contra-indicate the pregnancy.—*Lancet, January* 30, 1858.

Case of Malarious Typhoid Fever. Reported by I. ROWELL, M.D.

Was called in haste to go some 35 miles distant in the country to visit a man sick with fever. The messenger, brother of the patient, expressed great anxiety for the latter, reiterating often, he did not believe we should find him alive.

On my arrival, I found his fears were too well founded. The patient lay pale and emaciated from two weeks' illness, under no treatment at all, or, what is usually worse, domestic treatment. He had a pulse of 140, so feeble as scarcely to be perceptible; a dry, brown tongue, cracked and fissured, sordes upon the teeth, involuntary discharges of a dirty, coffee-grounds appearance, involuntary passages of the water, urine highly colored, a tympanitic condition of the bowels, great gastric irritability, frequent vomiting, the stomach rejecting even a spoonful of water. On inquiry, I found that he lived in a highly malarious neighborhood, and that the stage of invasion of his disease was ushered in with a heavy chill, and for several days subsequent to the attack there was a marked periodicity attending his fever, and that the exacerbations occurred regularly, at the same time of the day. I decided at once that his disease was a remittent form of fever, which, by neglect, had run into a continued form of a typhoid character.

Treatment.—Quinine, it is unnecessary to state, is the sheet-anchor in such cases, but how could we exhibit it in order to get at its effects? The stomach rejected it immediately; it was tried by enema combined with anodynes, with like unsatisfactory results.

Relying with the fullest confidence on the efficiency of quinine, if I could get it into the system, as a last resort, I dissolved about half an ounce of that article in water acidulated with sulphuric acid, and applied cloths saturated in the solution to nearly the entire surface of the patient.

Very much to my surprise, he rapidly recovered. In twenty-four hours the urgent symptoms had nearly all disappeared; the pulse had increased in volume and diminished in frequency; sensibility, too, had returned; the irritability of the stomach and bowels had subsided; the subsultus no longer existed; those secretions which were before suppressed, reappeared; the tongue and skin were moist, and in place of the speechless, cadaverous, ghastly, idiotic mass of mechanically breathing human clay, we again had a rational, intelligent man. The subsequent treatment was tonic, alterative and diaphoretic.

The recovery was rapid without any untoward symptoms.

Query—Was it the endermic exhibition of the quinine that saved the patient?—*Pacific Med. and Surg. Journal.*

Value of a Young Lady's Teeth.

The Paris courts value a young lady's teeth at 8,000 francs. An English governess was recently knocked down by a carriage, and lost by the accident all her teeth. She brought on an action of damages, and the tribunal awarded that amount.

HOSPITAL REPORTS.

Clinical Records.

Report of a Case of Tetanus occurring in Bellevue Hospital under the care of Dr. Jas. R. Wood, Visiting Surgeon. By J. J. CAMPBELL, M.D., House Surgeon.

Rebecca H., aged 38, pretty good constitution, but of intemperate habits, was admitted into Bellevue Hospital, at 4 P. M., February 7th, 1858, with severe burns of both lower extremities, caused the evening before by getting her clothes on fire. When admitted, she was suffering a great deal of pain, and her stomach was so irritable that she could scarcely retain any of the nourishment and stimulants that were given her. Her pulse was frequent and feeble, and she had slept none the night previous. Stimulants and anodynes were given freely, and her limbs were ordered to be dressed with cotton soaked in equal parts of linseed oil and lime water.

Feb. 8th. Did not sleep any last night, although she had taken the eighth of a grain of morphine every hour since her admission; her stomach still remains irritable; her pulse continues frequent and weak, and her limbs feel easier. Sub-nitrate of bismuth, opium, and a small quantity of carbonate of ammonia, ordered in pills, to be given with the view of allaying the irritability of her stomach. Beef tea and rare boiled eggs directed to be taken in small quantities at a time. Stimulants and anodynes to be continued as before. This course of treatment was persevered in, but she did not improve much until February 11th, when she was able to retain all the nourishment that was given to her. Her pulse still remained frequent, although it was stronger than when she came into the hospital. She rested better at night, and continued doing well in every other respect from this time until the morning of February 15th, when she was attacked with the symptoms of trismus, that I first noticed by directing her to put out her tongue, which she could not do to any extent, as she could not separate her jaws more than three quarters of an inch. On inquiry, I ascertained that she had some stiffness in the muscles of the back of the neck. I then desired her to swallow a little beef tea, which she did with great difficulty and a feeling of choking. Morphine, in half-grain doses every two hours, was ordered to be given, and her allowance of stimulants increased.

At 11.30 A. M. she was seen by Dr. Wood, who directed that she should be put upon a stimulant, anodyne and anti-spasmodic course of treatment. Twenty ounces of brandy and a pint of madeira wine were

ordered to be given in the twenty-four hours. The morphine was given pretty freely by the mouth; but as she could not swallow as much of the stimulants as was directed, they had to be in part injected into the rectum with two ounces of lac assafœtida and one drachm of tincture of opium every two hours. She was also directed to be kept as quiet as possible. Her pulse at this time was 128, quick and moderately full, and her respiration a little more frequent than it had been for a few days past. There was not much increase in the severity of the symptoms up to 10 P. M. At 11 P. M. she commenced sleeping, and continued doing so until 2 A. M., after which she remained wakeful.

9 A. M., February 16—pulse 128, quick and moderately full; respiration 24; cannot separate her jaws more than one-third of an inch; has great difficulty in deglutition; muscles of the neck quite rigid; head drawn back, and does not appear to suffer much when undisturbed. She has had no spasms except of the muscles of the back of the neck. Same treatment continued.

6 P. M. With the exception of a little more difficulty in swallowing, is in much the same condition that she was this morning.

Feb. 17th, 9 A. M. Slumbered a little during the night; pulse 132, quick and weak; respiration 34; rigid spasm of all the muscles about the jaws and neck, and cannot drink from the feeding cup; and all the fluid she swallows has to be injected into her mouth with a small syringe. Her face assumes a livid hue during each attempt at deglutition. Has to lay on her side, owing to the strong contraction of the muscles on the back of her neck. Loud rales, produced by the air passing through the secretions in the mouth, can be heard while standing by her bedside. Her bowels moved during the night for the first time since the 14th. At 1.45 P. M., was seized with a convulsion that affected the whole body, but more especially the muscles of the back and neck. Well-marked opisthotonos remains. Her jaws are rigidly closed, and she cannot swallow anything. At 3.40 P. M., has had another general convulsion that lasted for about a minute. At 4.45 P. M., has had another convulsion like the two former. Pulse 120, and weak; respiration 45, and is perspiring quite freely. Chloroform was tried, and the muscles closing, the jaws relaxed a little. From this time until twenty minutes of six, when she died, she had a great many convulsions. Just as she was breathing her last, all her muscles became quite flaccid. During the two hours preceding her death, one ounce of the tincture of opium with very near a pint of brandy and wine were injected into her rectum. She remained rational until the last moment of her life.

Her burns looked healthy all the time.

Post mortem 39 hours after death. Slight rigor mortis. Some venous congestion of the vessels of the brain and spinal cord. About two ounces of serum escaped on opening into the dura mater of the brain and cord. No other condition noticed in these parts. The right side of the heart, especially the right auricle, was distended with black, clotted blood, while the left side contained but very little. This organ felt normal. No ulceration could be detected in either the stomach or duodenum. The colon contained a great deal of scybalæ. The bladder was empty and contracted.

A Case of Strangulated Femoral Hernia, occurring in Bellevue Hospital, in the service of Dr. Jas. R. Wood, Visiting Surgeon. Dr. J. J. Campbell, House Surgeon. Reported by J. M. FARRINGTON, M.D., Assistant Surgeon.

Matilda R., a widow, æt. 49 years, of good constitution, large size, and corpulent, was admitted in hospital on the evening of Feb. 1st, 1858.

She gave the following history of her condition previous to admission. On the morning of the 29th, as she sat low down to light a fire in her stove, she felt something yield in the region of the right groin, which caused her sudden and severe pain. She was put in bed and a physician sent for. He came, and ordered some medicinal enema, which was retained, and nausea and vomiting came on after its employment. This physician left her promising to call again soon, which he did not. On the following day another physician was called in, who informed her and her friends of the grave character of the accident, and as they had not the proper conveniences for the operation to be performed at her house, he advised them to have her taken to the hospital for the requisite operation. He ordered a medicinal enema, which like the former one was retained and followed by emesis. He also directed poultices to be applied over the tumor.

There had been no movement of the bowels since the accident occurred. She had vomited several times a dark bilious matter.

On admission, she exhibited little anxiety of countenance. Pulse 92 per minute, and apparently normal in character. There was a tumor in the right groin, about the size of a duck's egg. It was slightly tender to the touch, especially at its neck. It gave a dull sound on percussion, as though it was an epiplocele, but it had a hard smooth feeling as though it was an enterocele. She complained of some pain in

the right iliac region, but there was no abdominal tenderness, nor tympanitis. Taxis was ineffectually tried, after which she was put under the influence of chloroform to relax the part, and the taxis was again tried, but in vain. She was next placed in a warm bath for some 30 minutes, during which time the taxis was tried, but without success. A large enema of warm water (nearly three quarts,) was then given. This was immediately discharged from the bowels, carrying with it a small amount of scybalæ. Within one hour after this she had a copious fæcal stool, soon after which an enema of half a pint of tepid water containing four scruples of pulv. assafœtida was given, which was retained for a short time, when it passed off, carrying with it a small amount of fæcal matter. She expressed herself as feeling much relieved by this free evacuation of the lower bowels. She passed her urine without difficulty.

At 8 P. M., ice was applied over the tumor, and kept on all night. The ice was tied in a piece of oiled silk, and then enveloped in a napkin and laid upon the tumor. It gave her marked relief from the pain. She was not inclined to sleep, and McMunn's Elixir of Opium was given in teaspoonful doses, every two hours until 3 A. M., (February 2nd,) when, as the insomnia continued, a teaspoonful of the anodyne was given every hour. 6.30 A. M., she vomited about 12 oz. of a dark green matter, which was the first that she had vomited since her admission. 7 A. M. There are no urgent symptoms; she appears to feel comfortable. 10.30 A. M. A consultation of the visiting surgeons was held, and all were united in the opinion that it was a case of strangulated femoral hernia, and that it demanded an operation. 1.30 A. M. She vomited about 14 oz. of a very dark green fluid. 2 P. M. The dissection of the tumor was made by Dr. Wood. As is the custom at this hospital when any important operation is to be performed, a notice was sent to each of the medical colleges immediately after the surgical consultation, and at the time of the operation there were present in the amphitheatre some 400 or 500 students and physicians, each of whom had a good opportunity of witnessing the dissection of the coverings of this hernia. Each of the layers were carefully demonstrated as the dissection was continued, until the hernial contents were exposed.

On cutting through the peritoneal layer, a slight amount of a dark-colored fluid escaped. The hernial contents consisted of a considerable mass of omentum enveloping completely a small knuckle of intestine. Hey's ligament, which was the seat of the stricture, was next divided. The intestine was of a dark mahogany color, but looked

somewhat brighter after the relief given to the circulation by division of the stricture. Adhesions were found about the neck of the sac, which were broken up by the finger; and as there was no fœtor, and the appearance of the intestine was favorable in color, it was deemed safe to return it into the abdomen, which was done. But the mass of omentum was so much constricted and adherent at its neck that it was not possible to reduce it with safety, and it was decided to ligature the mass close up to the femoral ring where it was quite narrow, and cut off the protruding portion. This was done, and the ligature was left hanging out of the external incision at the same time it held the divided end just outside of the ring. The external incision, which was _|_ shaped, was closed by sutures and adhesive straps, excepting the most depending corner, which was left slightly open to permit the escape of any matter that might collect in the wound. Patient was under the influence of chloroform during the operation. 3 P. M. Pulse 88. Gave ½ gr. of sulphate of morphia. 4.30 P. M. Gave ⅛ gr. of morphia, and ordered ¼ of a grain to be given every hour until sleep was induced. 10.30 P. M. Has slept for the last two hours; pulse 100; she feels comfortable; pupils slightly contracted; semi-narcotized. February 3rd, 1 A. M. Pulse 88; respiration 8; pupils contracted; ordered the morphia to be discontinued. 7 A. M. She is comfortable; has slept most of the time since last note; pupils slightly contracted; pulse 104; very little pain on pressure over the abdomen or groin. There have been as yet no bad symptoms; everything given is retained. Her diet consists of egg, arrow root, and beef tea in small quantities. 9 A. M. Gave ¼ gr. of morphia, and ordered it to be repeated every hour. No marked tenderness over any part of the abdomen. 12 M. Abdomen slightly tympanitic and painful on percussion and pressure; countenance more anxious. Passed her urine at 7 A. M., but cannot pass it now; tongue dry. She looks decidedly worse; pulse 112. Morphia with tincture of veratrum viride was ordered.

As Dr. Wood had to be absent from the city a few days, Dr. Willard Parker, at Dr. Wood's request, took charge of the case. Dr. Parker saw her at 4 P.M. He directed xv. grs. of calomel with iii. grs. of opium to be given at once. She has passed her urine since last note. Tenderness less marked than it was. The wound was dressed at this time, its edges were in good coaptation, and there was but little oozing of matter from it. Leeches were ordered to be applied about the wound, but as the tenderness continued to diminish, they were not employed. Warm turpentine stupes were applied over the

abdomen while the tenderness and tympanitis were present. 5.30 P. M. She has no tenderness over any part of the abdomen, not excepting the right groin. The tympanitis has subsided. Pulse 105, and full. Skin and tongue moist. The tongue and fauces have been very dry, for which dryness she has had bits of ice to hold in her mouth. 8.30 P.M. Still very comfortable, no return of the pain or tenderness; has passed her urine. 10 P. M. She is in a deep sleep. Pulse 105; respiration 7; pupils contracted. Roused her and ordered the morphia to be discontinued. Feb. 4th, 8 A.M., has passed a comfortable night, tongue and skin moist, has taken no morphia during the night, has no marked tenderness over the abdomen, has vomited once this morning, the first since the operation. There is a slight amount of discharge from the incision. 12 M. Has vomited five times since last note; the matter ejected from the stomach is the beef tea, etc., which she has taken. Dirty looking pus in the wound. Tympanitis is present. Patient looks decidedly worse, drowsy, with depressed countenance. Ordered the morphia and veratrum viride continued. She took $\frac{1}{8}$ gr. morphia, and 5 gtt. of the tincture of veratrum every hour. 1 P.M. Her bowels moved in bed, of which she was scarcely conscious. The vomiting continues. 3 P.M. She was seen by Dr. Parker; as the tenderness had returned, and was most marked over the transverse colon, he directed a long blister to be placed over it, and ordered 3 grs. of opium, with 2 of calomel, every two hours. He also directed ʒss. of the following mixture to be given every two hours, to control the irritability of the stomach:

℞.—Ether chloric, ʒss.
Acid Hydrocyanici, gtt. xx.
Aq. menthæ pip. ʒiiiss.
M.

8 P.M. She is sinking; looks cadaveric; pulse 105 and weak. Wine ordered to be given occasionally. She has not slept for several hours. 12 P.M. Pulse 120, weak and quick. Complains of cold, extremities are cold. Ordered warm blankets. She is vomiting and much depressed, eyes are sunken and dark areola around them. Says she feels bad, has some pain in abdomen. She continued to sink, and died at 10.30 A.M., Feb. 5th.

Autopsy 24 hours after death. There was some sloughing around the external incision, and the whole extent of the track through which the hernia had passed and the incision had been made, presented a dirty gray aspect. The portion of omentum to which the ligature was affixed was discolored and gangrenous for a very short distance from the ligature, but the latter had caused no extended inflammation.

There was evidence of a slight amount of peritonitis, as small patches of lymph could be seen at various points on the intestines. A knuckle of the ileum was found slightly adherent from recent inflammation, at the femoral ring, and it was at first supposed that this was the portion that had been incarcerated, but on searching upward in the umbilical region, slightly to the right of the mesial line, a portion of darkened intestine was noticed. Its appearance was very marked, and readily distinguishable from other portions of the small intestines. It was blackened, though not gangrenous, excepting at one point, which was probably the point that had been encircled by the stricture at the saphenous opening. It was a line extending about one-fourth of the distance around the intestine. This had softened so that on the slightest tension being made it parted. No extravasation of fæcal matter had occurred, as there was no perforation previous to the post mortem examination, when, in cautiously lifting the intestines, the softened portions parted. This knuckle of intestine which had formed the hernia was a portion of the ileum, and on the measurement was found to be nearly equi-distant from the pylorus and the ileo-cœcal valve.

EDITORIAL AND MISCELLANEOUS.

— With this number, it will be observed that another name has been placed upon the cover, as an addition to the editorial corps of the Monthly. The initials, L. H. S., are well known to all who have been familiar with the pages of this journal, as accompanying articles of great value and practical interest to the profession. It is therefore with great pleasure that we congratulate ourselves and our subscribers, in having succeeded in attaching to our journal the ready and able pen of the writer of those articles. Hereafter, Dr. Lewis H. Steiner, of Baltimore, Md., will devote himself with the other editors to the pleasant duty of making the Monthly still more acceptable to its readers.

— The Academy of Medicine held its regular meeting on Wednesday evening, February 2nd, Dr. Valentine Mott in the chair. After the minutes of the January meetings had been read and approved, Dr. Mott gave his valedictory address. In resigning the chair to his successor, Dr. Batchelder, he took occasion to dwell upon the increasing reputation and influence of the Academy, over which he had presided during the past year. He said that he held diplomas from most

European societies of a similar character, from Constantinople in the East to Dublin in the West, but of none was he prouder than of the one which he had from the New York Academy. Dr. M. urged the Fellows to continued exertions, and to unity of purpose, so as to make it in no degree an imitation or reflection of other institutions of a similar character; but that it should retain its individuality, and be second to none.

Dr. Mott then presented the constitution of the Academy to Dr. J. P. Batchelder, the President elect, and resigned the honors and the labors of the chair to his hands.

Dr. Batchelder said that he deemed it a happy circumstance that he was permitted to receive the constitution from one who was so distinguished, and whom he was glad to call his friend. As it was obligatory on him to address the Fellows upon this occasion, he should make a few remarks upon a subject which had never been discussed from that chair. The Doctor then proceeded to speak of the obligations, relations and duties of each individual Fellow of the Academy, and of the Academy to itself. He spoke of the labors of the past year, of the various papers which had been read, of the discussions which had been held, and of the earnestness with which some of the Sections of the Academy had entered upon their duties. He dwelt upon the necessity for an increase in the number of meetings, and urged the erection of a building for the especial use of the Academy. In contrasting the state of medical education in New York before the organization of the Academy and at the present time, Dr. B. spoke of the increased facilities in the way of clinical instruction at the colleges and the hospitals, and drew a happy augury of its effects upon the progress of the profession at large, and particularly of this city. He urged the Fellows to attend regularly, and to consider that when they signed the constitution they gave their bond to abide by its rules and to further its designs.

Dr. Vandervoort read a report from the Committee on Nominations, setting forth the difficulties frequently met with by the committee in getting satisfactory data in relation to the character and standing of nominees, but denying that they had ever recommended a nomination to the Academy without first carefully ascertaining, even with great trouble to themselves, the status of each person.

Dr. Warren read a report from the Committee on Medical Ethics. "A charge against a Fellow," sent to them, had been withdrawn, and the communication from a Medical Society of a neighboring city, referred to them by the Academy, had been carefully considered. The

committee desired instructions upon the question whether a charge against a Fellow, emanating from another society, could be entertained by the Academy. If not, then the committee would recommend that the communication be read before the Academy.

Dr. Downs read a report of the Section of Theory and Practice, recommending that the paper read by Dr. E. H. Parker, on the preservation of Vaccine Virus, and that read by Dr. J. McNulty, on Large Doses of Opium, be placed on file; also, that the paper read by Dr. Horace Green, on Lesions of the Epiglottis, be ordered to be printed.

Dr. E. H. Janes read a report from the Section on Materia Medica and Botany, concerning Thayer's Fluid Extracts.

An exceedingly interesting and valuable statistical paper upon Prolapsus of the Umbilical Cord, with a description of his treatment of it, viz., by placing the patient on her hands and knees, was read by Dr. T. G. Thomas.

Dr. J. W. Francis spoke of the paper in a very commendatory manner, and related some of his recollections of the early medical teachers of this city, and of their method of treating this complication of labor.

The reports of various other committees were then received, after which the report of the Committee on Ethics, before mentioned, was called up. A lively discussion ensued, and it was finally decided that the complaint could not be acted upon by the committee. The reading of the complaint to the Academy was made the order for the next regular meeting. This complaint, it is understood, is made by a Society in Philadelphia against Dr. Reese, of this city.

— The Medical Society of the State of New York held its annual session at Albany, on the second, third, and fourth days of February, about ninety delegates and permanent members being present. This Society is composed of delegates from the various County Societies, the Medical Colleges of the State, and the New York Academy of Medicine; the last mentioned being the only Society, besides the county associations, recognized by the law of the State, under which the State Society is organized. The President is elected for one year, and this year the honor belonged to Dr. Augustus Willard, of Chenango County. Dr. Thomas C. Brinsmade, of Troy, was the Vice-President, and Dr. S. D. Willard, of Albany, was Secretary. The session was opened by a short address from the President, in which he touched upon the various topics to which he especially desired to call the attention of the Society. It was marked by a straightforward earnestness and a business-like manner that was highly ap-

preciated. The most important matters which came up for consideration the first day, were the following. The suggestion of a petition to the Legislature of the State for a more perfect registration law, came from the Broome County Medical Society, and led to considerable debate, being urged on one side, in consequence of the incompleteness of present returns, and opposed on the other, because it was as yet impossible to get a more effective law passed; and it was not wise for the Society to be always asking the Legislature to pass laws. The matter was referred to a committee consisting of Drs. Griscom, Orton, Hough, and Parker, who subsequently reported that it was best to wait, without action, till there had been a report on the same subject made to the American Scientific Association, as one was being prepared for that body with great care, and by able men.

A series of resolutions covering the death of Dr. Thomas Spencer, was adopted, and a memoir of him read by Dr. S. D. Willard. Dr. Brinsmade read a paper, according to the by-law which requires that service of the Vice-President. It was a sketch of his own registration of disease, for twenty-five years, and furnished some interesting facts. The paper cannot be well condensed or described in brief, and as it will appear in the Transactions, we shall await their publication, to refer to it again. It was highly appreciated by the Society.

In the afternoon, Dr. Griscom presented the claims of the bill for the improvement of the Sanitary Police of New York, that the members might lay it before the members of the Assembly and Senate with whom they were acquainted. Dr. Corliss, of Washington County, took occasion to "come down" on New York for its wickedness in that "I am holier than thou" sort of way, which is not very uncommon. All the vice of the city is looked at, and all of the goodness, the charity, and the piety, (which are great,) are ignored. The New York delegation were not silent under the imputation. Dr. Peter Van Buren, of New York, commenced reading an elaborate paper on Anæsthetics, which was interrupted by an adjournment. In the evening this paper was continued, and another on the same subject was read by Dr. Orton, of Binghamton. A paper by Dr. Coventry, on Cerebo-Spinal Meningitis; one by Prof. March, of Albany, on Urinary Calculi, and the exhibition of pathological specimens made up the occupations of the evening. After the adjournment, many members called on the Governor of the State, according to his invitation.

On Wednesday, the Society was requested to accept a present from Tilden & Co., manufacturers, consisting of sugar-coated pills, (an imperfect imitation of Garnier, Lamoureux & Co's,) some active principles

of plants done up in little papers like those used for seed, a good way too, and quantities of tincture of veratrum viride. Thanks were given to the makers. Some efforts were made to increase the proportion of delegates who could be elected permanent members, but an alteration of the statute was found to be a necessary step, to be first taken. A committee was appointed to attend to this alteration. Dr. B. Fordyce Barker, of New York, read a paper on "the comparative use of ergot and the forceps, in labor," in which he gave strong reasons for preferring the latter, and for using them more frequently than many do, while he at the same time urged a more sparing use of the ergot. We should say, that this was decidedly the paper of the session, interesting all by its practical character and well fortified reasonings. On its publication, we shall reprint a large part if not the whole of it. Dr. Van Dyck, of Oswego, read some obstetrical statistics; Dr. Orton, of Binghamton, an account of a case of ovariotomy, by the Dr. West; and Dr. Quackenbush, of Albany, reported a case of inversion of the uterus, with his method of treatment. Dr. Armsby, of Albany, showed his device for the radical cure of hernia.

The important papers of the afternoon were, a report of traumatic aneurism, by Dr. Bontecou; of a parasite growing on an ulcerated surface on a child's leg, by Dr. Harris, of New York; a paper on cerebro-spinal meningitis, by Dr. Kelley; and one by Dr. March, on "fractures of the neck of the thigh bone with bony union within the capsular ligament." The committee on the essays upon scarlet fever, reported that three were received, but at so late a date that they could not decide upon their merits, and asking to be continued another year, and that the invitation for essays be likewise extended.

In the evening, the President delivered the address required by the by-laws, in the Assembly Chamber, to a large and appreciative audience. His subject was "air, exercise, and sunlight," and though it was interesting and instructive, we must omit even a synopsis of it. At its close, the Society adjourned to the Delavan House, and sat down to the annual supper—a very pleasant affair.

Of the third day's session, we have now only to say, that it lasted about four hours—was occupied in part by the election of officers for the ensuing year, and in part by scientific papers and discussions, when the adjournment took place.

The session was, on the whole, much better than that of the preceding year, so far as the supply of scientific papers was concerned. No one regretted being present, while many declared that it had been to them a real benefit.

—At Albany, recently, a man was found in a dwelling house under circumstances which justified the suspicion that he was a burglar. He appeared to be deaf and dumb, but some doubts having arisen as to his really being so, Dr. Staats was consulted concerning him. The story of his treatment, and its success, is thus told by the *Evening Journal*. "The Doctor appeared at the jail, with several formidable weapons of blood and slaughter. By the aid of the jailor and several other officers in attendance upon the jail, the prisoner was placed upon and fastened down to a table. Thus secured, the Doctor after testing his instruments, announced the character of the operation, and that was to make a large incision in the throat, and thus reach the difficulty in the tongue. He said it was very dangerous, and the chances were about even as to the patient's surviving it. He stated that one of the material chances involved in the case, was as to the length of time that the disease had existed. Then addressing the patient in a familiar way, he asked him 'How long he had been so.' At once the fellow, in a doleful, pitiful, and cowardly tone answered, 'Oh! only a short time, Doctor!' The game was up at once."

— Palmer's Artificial Leg is so well known, that it is not necessary to say a great deal concerning it. But those who are not familiar with it, should take the uninterested testimony of the distinguished surgeons who have certified that it is the best yet invented. We have lately examined its claims in comparison with those of its principal rivals, and it seems clear that it holds the first place. The first patient that we ever saw who wore one, was a lady, and it was impossible to tell, by the gait, which was the artificial foot. This was then a marvel, but now it seems to be rather common to furnish persons who have lost both legs with useful substitutes, even when the amputation is above the knee. It is certainly a great work thus to restore to active life persons who must otherwise be among the most helpless of cripples. Palmer & Co's "*Artificial Leg Reporter*," which is distributed gratuitously to persons wishing for it, contains some interesting and valuable information concerning the place at which various amputations should be performed, when election is possible.

—"Your nauseous drugs disgust me," said Napoleon to his physician, Dr. Antomarchi. The whole world has felt this disgust, for the exhibition of medicines in a pleasant form has received but little attention from the profession. Empiricism has seized upon this distaste for the drugs so unpalatably presented, and under the guise of sugared nothings has established itself in our midst. To rob the dose of its

disagreeable feature was its sole office; that of true science is to guard its efficacy, while it presents it in an agreeable form. Now we have the means of giving the most nauseous drugs in the most efficient form without exciting the least feeling of disgust, or suggesting the idea that any medicine has been taken. Assafœtida can be swallowed *ad libitum*, without leaving in the mouth its characteristic taste or smell; quinine or strychnia can be given in suitable quantity, without the patient becoming aware that a powerful or bitter drug has been taken. To adults this may not be necessary, though it is a desideratum even with them; but for children this new form is particularly precious. We have tried many of the beautifully prepared sugar-coated pills of Garnier, Lamoureux & Co., and have been particularly pleased with their efficacy and convenience of administration. The pills of santonine have become a necessity with us as a vermifuge, and the *dragees* of copaiba and cubebs equal in every respect, if they are not superior to the capsules of the same disagreeable medicaments. A great advantage of this method of administering medicine is the certainty of each dose. This is especially true of the alkaloids, were the dose is sure and the preparation reliable. From all that we can ascertain in relation to the manufacture of these pills, they are prepared with the utmost care and nicety, the formula of which are no secret, having been published and widely circulated. The sugar-coating preserves the enclosed drug in its original freshness, as we know by the examination of some which have been in our possession for more than a year. The coating is sufficiently hard to bear transportation, and not so hard as to chip off or leave the contained pill bare.

—Some months since the demise of the *California State Medical Journal*, an excellent quarterly, was announced, greatly to our regret, for there was a vigor and freshness about its pages which was gratifying. It was discontinued, like many other worthy medical journals, from the failure of its subscribers to meet their part of the engagement, throwing both the labor and expense of publishing upon the editor. As its successor we have received the first number of a new journal called "*The Pacific Medical and Surgical Journal.*" It was issued in January, and is a monthly of 48 closely printed pages. *Dr. John B. Trask* and *Dr. David Wooster*, of San Francisco, are its editors. This number is illustrated with a well-executed lithograph accompanying an able paper "on the Reproduction of Bones," by Dr. Tolland. We hope for the Pacific Medical Journal a prosperous career.

—A union has been effected between *The Western Lancet* and *The Cincinnati Medical Observer*. Dr. Blackman ceases to be an

editor, the allied journals being conducted by the former editors of the last named journal, under the title of the *Cincinnati Lancet and Observer.*

—The *Medical Independent*, of Detroit, closed its third volume and its existence with the February number. It has become incorporated with the *Peninsular Journal of Medicine.* Dr. L. G. Robinson retiring from the former, Dr. Moses Gunn uniting with Dr. A. B. Palmer in editing the latter, the three other former editors retiring. This concentrates the talent and patronage of the medical profession in Detroit and Michigan upon one journal.

—In England, Dr. Lionel Beale, who has so admirably conducted the work of Todd & Bowman to a successful termination, has issued the first number of a Journal, entitled *Archives of Medicine.* It is beautifully printed, profusely illustrated, and contains several articles of great practical value from Dr. Beale's own pen. The object of this new medical periodical is to furnish "a Record of Practical Observations, and Anatomical and Chemical Researches connected with the Investigation and Treatment of Disease." A portion of a clinical lecture by Dr. Todd, extracted from its pages, our readers will find among our selections.

— The Fire Marshal, in his annual report to the Common Council, has made some timely and important suggestions as to the use of hot-air furnaces. He disapproves of them, both on account of their danger, and as injurious to health. In our public schools, he says, they are considered as a source of much ill health among the children. In this connection, he makes the following remarks:

"It is found from experience that the heated air thrown off from furnaces and iron surfaces generally, is divested of most of its vit properties, and is apt to produce congestion. In the case of persons of delicate constitutions, this tendency is immediately developed by furnace heat, and hence the number of children who are sent back ill to their parents. But not merely is this effect complained of in our ward schools; it has long since attracted the attention of physicians, and in some families the use of the furnace is positively prohibited. In a climate where dyspepsia and nervous complaints are so common, and where but comparatively little bodily exercise is taken, it is obvious that any system of heating which produces these symptoms, is desirable to be avoided."

For heating purposes, especially large buildings where many persons are congregated, he prefers the use of hot water pipes, as giving a more genial warmth—though not so great a degree of heat—which is found to be less injurious to the health.